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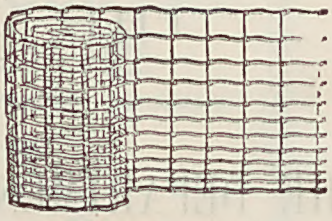

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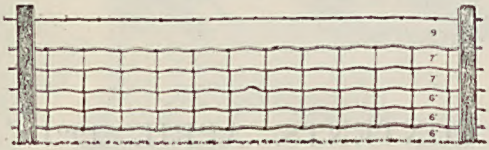

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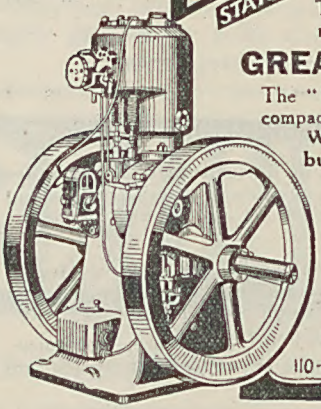

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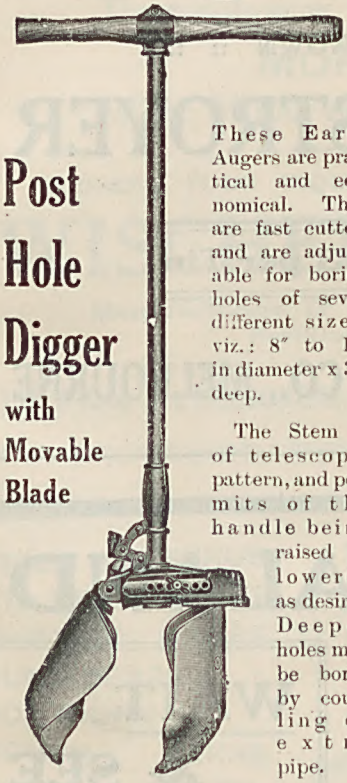

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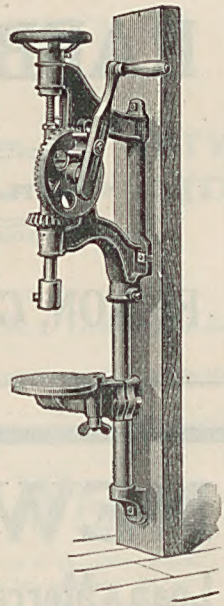

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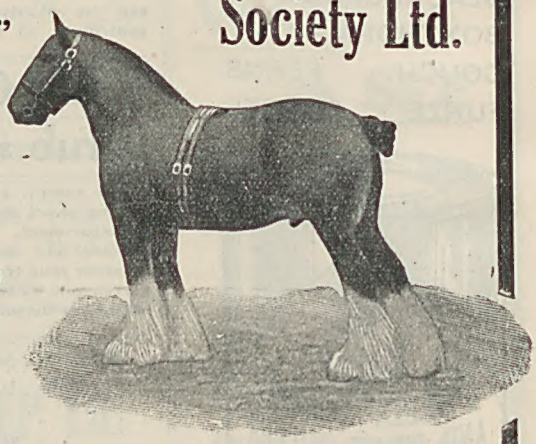

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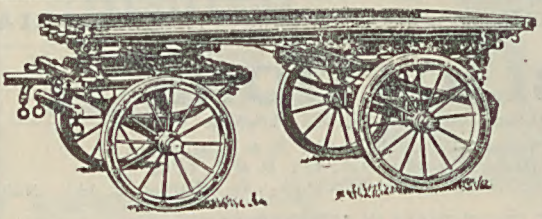

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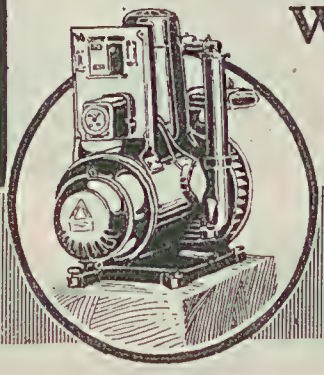

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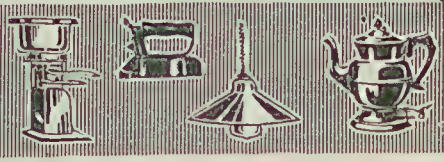

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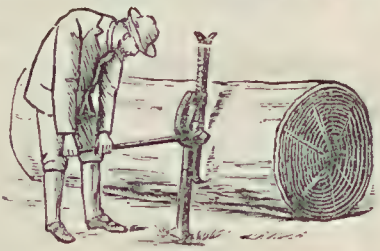

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MALLEE SETTLEMENT SUCCESSFUL.

SECOND OUYEN FARM COMPETITION.

Report by the Judge, H. A. Mullett, B.Ag.Sc., Chief Field Officer, Department of Agriculture.

The history of the new Mallee settlements of which Ouyen is the pivot is short. It goes back scarcely a dozen years, but that does not rob it of fascination, far from it. There is something which grips the imagination in the conversion by a handful of pioneers of an unprofitable wilderness into a rich wheat province. It is surely an unparalleled feat for them to have, at the end of eleven years, in a single season raised 450,000 acres of wheat, worth approximately £2,000,000.

This country was originally taken up by sheep and cattle men, but the holdings eventually reverted to the Crown. Kow Plains held out till 1899. Subsequently there was no settlement until 1909. Then came the railway, the public water supply, and then the sturdy pioneer equipped with mallee roller and his stump-jump implements. Where unorganized sheep pasturing failed, wheat farming has triumphed.

The settlers have had a hard struggle. They have had to face drought and every difficulty associated with Mallee settlement; but, despite many vicissitudes, it may be claimed that, at any rate after the present season, the majority will have succeeded. That is to say, most of the pioneers who started, say, nine or ten years ago with but a few hundred pounds have been able to convert it into a substantial asset in the shape of a fairly well-improved wheat farm.

Quick Returns in the Mallee.

A striking feature of Mallee settlement is that, despite the dense mallee scrub, the land may be rapidly and cheaply brought under cultivation, and profitable crops of wheat grown. Thus substantial returns

are furnished within the first year of settlement, and can be maintained fairly regularly from then onward, except for an occasional drought. The following table illustrates the point. It furnishes an instance of the actual yields obtained by one settler from his first year of settling on a green mallee block. During the past nine years, 31,304 bushels of wheat were grown on a total of 2,488 acres, or an average of 12¾ bushels per acre. This period included two droughts, when practically no wheat was harvested at all:—

Yields obtained by a Mallee Farmer during the First Nine Years of Settlement.

Year.	Acreage Sown.	Cut for Hay.	Acreage Stripped.	Yield.	Yield per acre.
				bushels.	bushels.
1911–12	235	35	200	2,800	14
1912–13	420	60	360	5,486	15
1913–14	180	25	155	2,020	13
1914–15	233	..	233	330	1
1915–16	320	45	275	4,688	16
1916–17	420	50	370	6,746	18
1917–18	420	50	370	6,160	17
1918–19	400	35	365	3,134	9
1919–20	160	..	160	grazed off	..
			2,488	31,364	

Average area stripped 276 acres. Average yield per acre 12¾ bushels.

It cannot be claimed that these results are at all high, but the important point is that they have enabled the settler to make good during the most strenuous period of settlement.

Pioneering Stage Passing—Readjustments of Methods Essential.

That so much has been accomplished in the past, despite many handicaps, surely augurs well for an era of increased prosperity of the settlement in the future. But the full measure will not be attained unless a considerable readjustment of farming methods takes place. The necessity for the subjugation of the mallee shoot no longer demands the stubble crop, neither should the state of the finances again warrant it as a despairing "double or quits" policy. On the contrary, the assets are now tangible, and should be closely safeguarded by farming methods in which the element of risk is reduced to a minimum. That this policy is the more profitable one is shown by the steady rise to prosperity of those fortunate few who have been able to carry it out. Once the shoots are killed and the finances placed on a sound basis, there is only one excuse for the stubble crop in the Mallee, and that is in receding land after a drought failure, especially when the price of wheat is likely to be high. For every acre of stubble-sown wheat this year in the Mallee there was this justification. But the same reason will rarely apply in the future.

Careful fallowing has proved the only sound practice in the Wimmera and older Mallee, where the rainfall is even better than at Ouyen. On

well-improved Mallee blocks fallowing as soon as practicable should therefore be regarded as a fundamental operation in preparing for the wheat crop. The results of Mr. R. F. C. Gniel, at Walpeup, and others last year were sufficient evidence of this.

But the improvement should not rest solely with the wider adoption of the fallow. There are other practices which, if adopted, will enhance the returns. There should, for instance, be a vigorous weeding out of the hay wheats, such as Warden, Turvey, &c., which are a legacy from the period when a tall wheat was necessary in order to clear the shoots. They should be replaced by more prolific grain-yielding varieties such as Federation, Currawa, Penny, Gallipoli, &c. Again, the average amount of fertilizer used might profitably be increased, and the results of experiments at Cowangie and Carwarp have demonstrated that 60 lbs. of "super." per acre is the most profitable quantity to apply.

As compared with 30 lbs., 60 lbs. will give an increased profit of 6s. 8d. per acre per annum, after paying for the cost of the extra quantity of manure out of the increased crop produced. This is the figure obtained from the results at the two centres mentioned for an average of six years.

Harvesting an Eight-bag to the Acre Wheat Crop, Ouyen.

Many farmers in the new Mallee have a pronounced antipathy for oats as a rotation crop, yet it should prove a profitable one to grow. Mr. P. G. Stewart, of Carwarp, and others have found it so. Judging by results, it yields surprisingly well under Mallee conditions. Oats will always outyield wheat as a stubble crop. This year Mr. John Hunt, of Ouyen, harvested 28 acres of stubble-sown oats for an average of 12 bags per acre. Oats provide excellent sheep feed in a dry year, and in a good year they make excellent hay. Further, they assist in combating the "Takeall" disease.

Lastly, sheep are an important consideration once the block is sheep-proofed. They convert waste roughage into profit. They consolidate fallows and keep them clean.

These are some of the things that are being recognised and put into practice by some of the more up-to-date men in the new Mallee, but their adoption is yet by no means general. It is a recognition of the value of improved methods to the Mallee farmer, and the necessity for putting them into common use that has led the Ouyen Agricultural Society to conduct its farm competition.

THE COMPETITION.

Five farms were entered for competition, and half-a-day was devoted to an inspection of each. The marks, details of which will be found elsewhere, were allotted according to a scale of points prepared by the society. Improvements, plant and implements, crops, fallow, live stock, water supply, fodder reserves, and subdivision were among the subjects to which detailed attention was given on each farm.

A Heavy Crop of Oaten Hay (good wheat crop alongside), at Mr. L. Barratt's, Ouyen.

Results.

The winning farm was that of R. C. F. Gniel, of Walpeup, with a total of 152 points. W. H. Lodwick was second, with 128. L. Barratt was third, with 124. Mr. Gniel's farm was strong in practically every department. Since last year a flock of sheep had been added, and a fine water supply laid on to the house and garden. The homestead and farm buildings were attractively situated, extremely well laid out, and neatly kept. Special attention had been paid to water supply, fodder reserves, and to the economical lay-out of the farm buildings. The wheat crop, though good, was not equal to that of Mr. Barratt or Mr. Gibbons. The fallow was, however, in fine order. The farm is well subdivided, and adequate wind-breaks and shelter belts have been left or planted. The horses and sheep were in splendid condition. This is a farm that would compare favorably with the best in the older settled wheat belt.

Mr. Lodwick's farm was notable for a good home, replete in necessary labour-saving devices for the women folk. There was an excellent garden, and ample supply of water in a fine 4,000-yd. dam. The farm buildings were of useful and convenient type.

Mr. Barratt's farm was not so well-improved as some, but he scored heavily with his crop. He had the best fences, and showed a fine new dam.

Name.	Improvements and Conveniences.			Crop.	Fallow.	Uncultivated Land.	Fodder Conservation.	Provision fo Water.			Plant and Implements.	Live Stock.				Subdivision.	Apparent Management.	Total.
	Home.	Farm Buildings and their Arrangement.	Fences.					Type of Dams.	Capacity of Dams.	Water Present and its Distribution.		Horses.	Sheep.	Cattle.	Pigs and Fowls.			
Possible Marks ..	**10**	**20**	**5**	**25**	**15**	**10**	**20**	**10**	**10**	**10**	**15**	**10**	**10**	**6**	**4**	**10**	**10**	**200**
R. C. F. Gniel ..	10	17	4	13	13	6	20	10	8	8	14	6	6	1	2	7	7	152
W. H. Lodwick ..	9	16	3	13	9	5	14	7	8	7	9	4	7	3	3	5	6	128
L. Barratt ..	4	3	5	20	12	5	15	9	5	7	7	5	8	6	4	4	5	124
John Hunt ..	8	9	4	12	7	8	8	5	4	6	9	8	5	4	2	8	6	113
W. H. Gibbons ..	3	9	3	15	12	6	10	7	6	6	6	7	5	5	3	4	5	112

Crops and Fallows.

Crops.

The crops as a whole were very good, but no surprise to those who know the capacity of the Mallee soil to grow wheat in a good year like that just passed. Most of them were stubble-sown, though a proportion was sown on what amounts to fallow, *i.e.*, last year's scanty stubbles. Several instances were seen where whole tracts of 640 acres had been sown on stubbles, and which would average 7 to 8 bags per acre.

Mr. Barratt's crop consisted of 90 acres of Dart's Imperial, 150 acres Yandilla King, 50 acres of Federation, as well as a share in another crop. Eighty acres were sown on fallow, and the remainder on land which was in crop last year, but grew nothing. The land was merely ploughed, drilled, and harrowed. Sixty pounds of seed per acre was used with 45 lbs. superphosphate. A 30-acre paddock of Dart's Imperial was best; it should average close on 10 bags to the acre.

Mr. Gniel's crop comprised 304 acres, 70 of which were sown on fallowed land. This was the best of his crop. A portion of the stubble crop was badly affected with Takeall. Federation, Currawa, Dart's Imperial, and Yandilla King were the varieties sown.

Mr. Gibbons' crop comprised 400 acres. Federation, Gluyas, Mac's White, Warden, Turvey, and Red Russian were the varieties grown. A small portion, sown without manure, provided a marked contrast with the rest of the crop.

Fallows.

The average area of fallow shown last year was not more than 50 or 60 acres. This year it is well over 150 acres. Evidently, then, the failure of the stubble-sown crops has not been without its effect. But the fallows, on the whole, were far from being in the best possible condition. Often the land had been but roughly ploughed, and left till seed time. Yet the better farmers find that it pays well to work the land after the rains in the spring and again in the autumn with light

implements such as the harrows and the spring-toothed cultivator. Heavier implements need using with some caution. They tend to prevent a perfect consolidation of the under layers of the soil. Care must also be taken with the treatment of the sand hills, as they tend to blow if disturbed when dry.

A Heavy Crop of Mallee Wheat. (Grown by Mr. L. Barratt, Ouyen.)

Team Harvesting Mr. Hunt's Crop of Algerian Oats at Ouyen. (Yield, about 12 bags per acre.)

Mr. Gniel had the best fallow. It consisted of 165 acres. It was ploughed to 4 inches deep at the end of July. Subsequently it was harrowed twice, and then spring-toothed. That of Messrs. Gibbons and Barratt was also in good order. The remainder were somewhat set on the surface, and showed barley grass—a host of the Takeall disease.

Improvements and Conveniences.

Most of the competing farms were surprisingly well improved, considering the many demands which the first few years of settlement made on the settlers' time and resources.

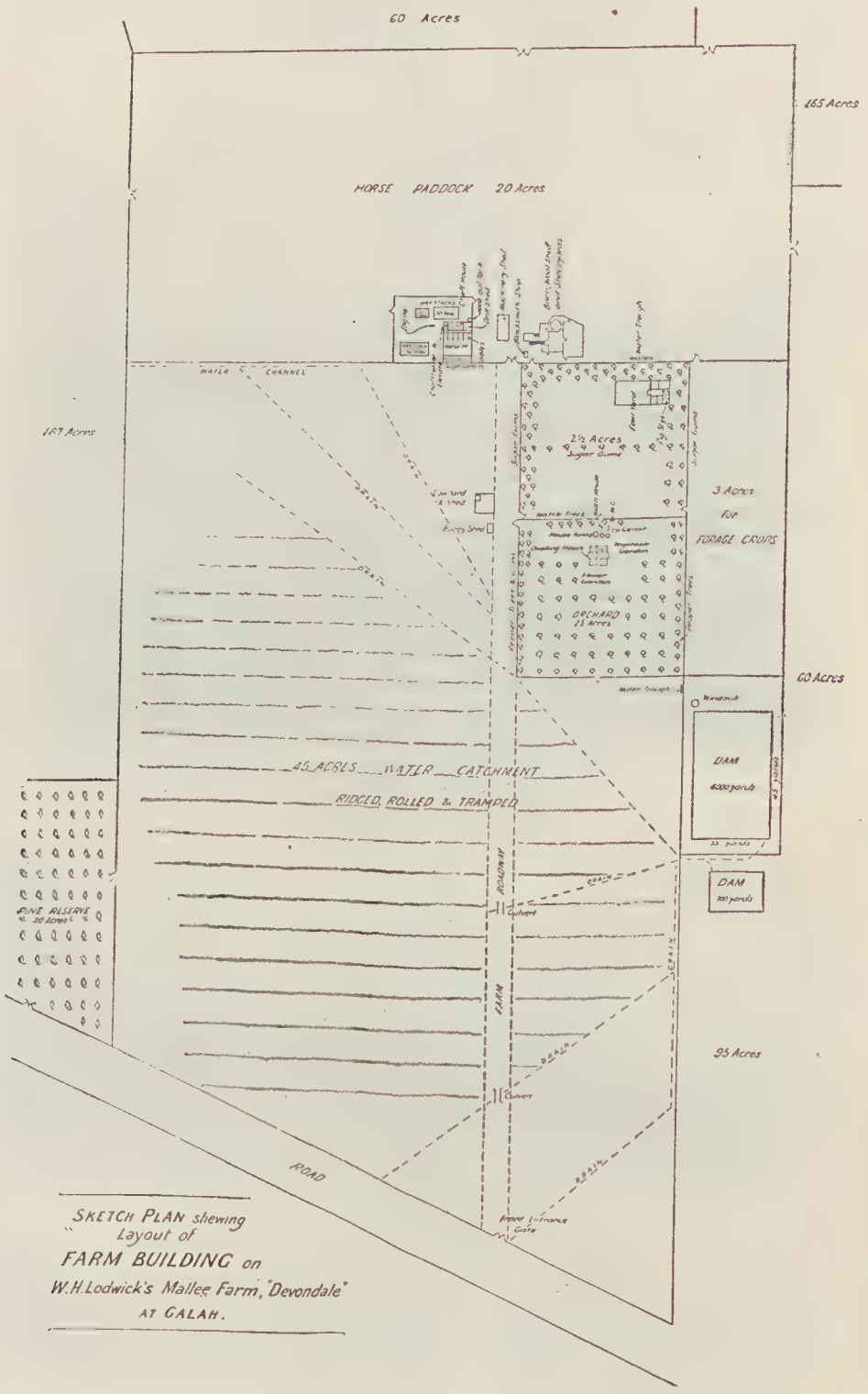
Mr. Gniel's improvements were fully described in the last year's report; but he has not been content to rest on his laurels. The past twelve months has seen the erection of a substantial redgum tank-stand, 9 ft. 6 in. high, with 3,000-gallon tank to provide water for house and garden. Another improvement is the inclosure of the house and garden on three sides by a high fence, which effectively arrests wind and dust. An interesting feature of this fence is the use of wire netting instead of the usual plinth, the idea being to prevent the accumulation of dust against the fence, and hence check the inroads of white ants.

A Convenient Type of Stable for the Mallee, Erected by Mr. Lodwick on his Farm at Ouyen.

Mr. Lodwick's improvements consist of a substantial six-roomed house provided with up-to-date conveniences in the shape of bathroom, washhouse, and cool cellar. The garden is neatly kept, and there were plenty of well-grown vegetables. Belts of young sugar-gums had been planted about the house and farm-yard. The homestead block is securely fenced from stock, and is well clear of farm buildings. These consist of a twelve-horse stable, with engine-shed and chaff-house attached, machinery shed, and woolshed and barn. There are also large pigsties capable of housing forty pigs. The whole of these buildings are of a serviceable type, and are neatly arranged. A plan is reproduced on page 200.

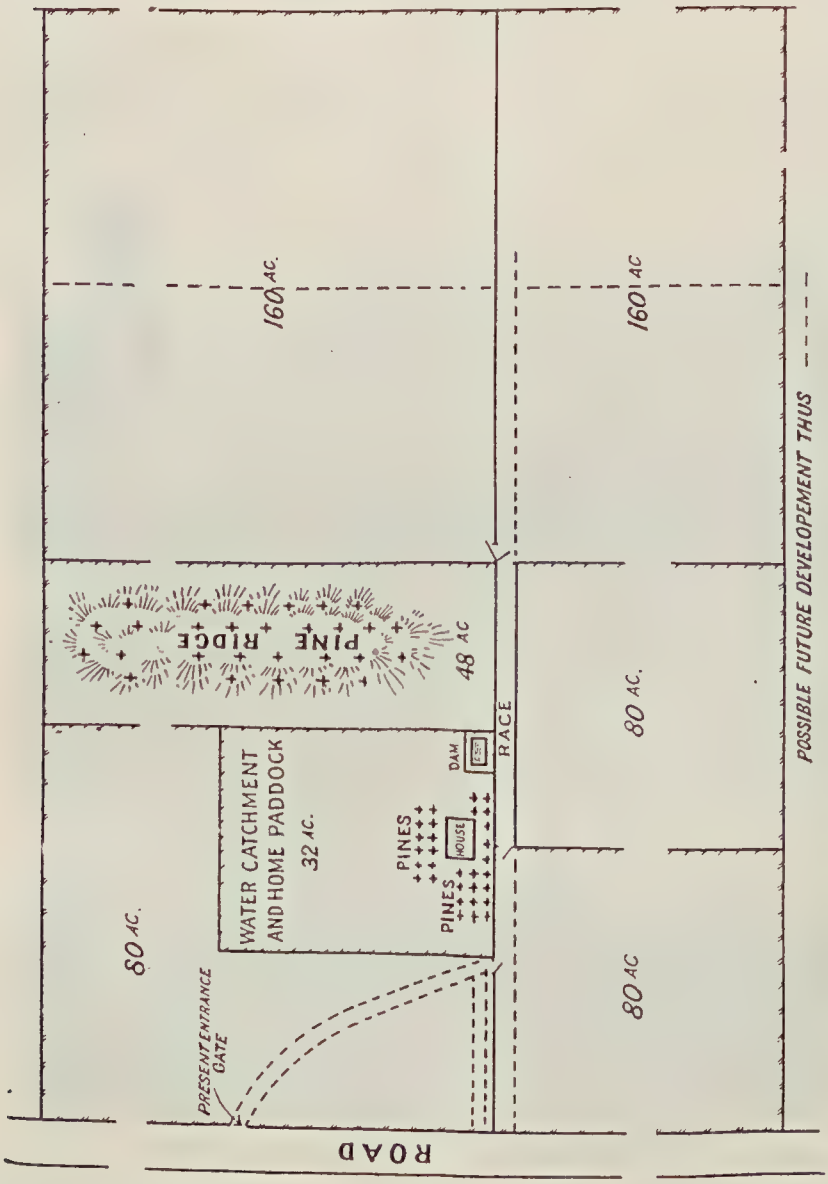
Some of the main faults of the other competitors were scattered buildings, stables too near the house or on the windward side of it, and inconvenient feeding arrangements.

Practically all of the competitors had sheep-proofed their fences. Mr. Barratt's were the most substantial. Mr. Gniel has recently erected 420 chains of new fencing, 2½ miles having six posts to the chain, with one dropper between posts. The remainder was three posts to the chain, with two droppers in between. All had five plain wires and a barb.



SKETCH PLAN shewing
Layout of
FARM BUILDING on
W.H. Lodwick's Mallee Farm, 'Devondale'
AT GALAH.

Special attention had been paid by Mr. Gniel to the prevention of drift sand piling up against these fences in cultivation paddocks, by the provision of an unploughed strip 10 yards wide along fences likely to be in the track of drift. On many of the farms the barbed-wire gate was still in evidence, but Mr. Hunt's place was notable for sixteen well-



Sketch Plan Showing Method of Subdivision Adopted by Mr. E. A. Harmer.

constructed, home-made wooden gates. A common fault observed with the gates on some of the properties was the use of short-driven spikes for hinge pivots. These are generally most unsatisfactory, as they easily pull out of the post under stress. A bolt that goes right through the post and fastens on the other side is to be preferred.

Subdivision and Water Supply.

Subdivision.

The following factors govern the subdivision of the average Mallee farm. From the point of view of working the block, the most economical position for the homestead and buildings is, of course, in the centre, but a number of considerations usually render it necessary to place the homestead elsewhere. In the first place, it is essential to have the buildings situated near an adequate water supply. West of Cowangie

A Fine Entrance Gate. (Made by Mr. J. Hunt on his farm at Ouyen.)

Mr. Lodwick's Homestead, Stable, and Dam, Ouyen.

water can be obtained by bores, but elsewhere except where stock and domestic channels are available, dependence must be placed on dams. Owing to the pervious nature of the soil the "run-off" is not great, and an area of from 10 to 50 acres on the most suitable spot must be reserved uncultivated as a catchment for the main dam. Somewhere in this vicinity is the best situation for the homestead.

It is obviously important also that the buildings should be located near the main road; so that the best site, if the water catchment and sand hills will permit it, is one reasonably close to the centre of the side of the block nearest the railway station. Other points to consider are shelter, drainage, outlook, and a firm dry camping place for stock. Positions on or near sand-hills should be avoided. The disposal of the various buildings about the farm-yard should be such that stock can be conveniently fed, sheltered, and watered. It is best illustrated by means of the plan on page 200. This is a plan of Mr. Lodwick's place, and a very good arrangement it is.

In planning the erection of subdivisional fences it is necessary to consider the accessibility to water and to the farmyard, and also to take into account the dimensions of the paddocks. Further, any plan should allow for possible future development being made without unduly interfering with the original arrangement. The presence of the long rolling sand-hills on so many blocks is also a factor which must be

Corner of Dam in Mallee, Showing Scouring which takes Place in Absence of Proper Chute of Iron or Concrete.

considered. If the stock are to be easily watered, it is necessary to provide access to the central dam by means of a race, or by grouping the paddocks round the water catchment. Again, it is important that teams travelling to and from work should do so by the shortest route possible.

Near the house there should be several paddocks of from 10 to 20 acres each. The main farm paddocks should, if possible, be rectangular and about one and a half times as long as they are broad. Unless there is a reasonable number of paddocks of similar area it will be difficult later on to work the farm on a satisfactory rotation system. Shelter belts should be left, or planted—preferably at corners. None of the competitors showed a subdivision of really first class order. Often this was due to the grafting on of additional paddocks after the original farm had already been subdivided. The best type of subdivision seen in the Mallee so far is that of Mr. E. H. Harmer, who

obtained the second prize last year. A plan of this farm is reprinted to illustrate the point (page 201).

Water Supply.

The run-off in the Mallee is exceptionally low and the evaporation is high. The latter is in the vicinity of 8 feet a year. In addition, the soil is loose and easily scoured, while drains are readily silted up by wind-blown sand. These points must be taken into account in starting and maintaining dams on a Mallee farm. An area of from 10 to 50 acres, according to the site and size of the dam, must be set aside and left uncultivated to provide sufficient catchment. Sometimes the catchment may be improved by ridging it with a disc plough and then packing it hard with a roller or with stock. Mr. Lodwick has his catchment area "corrugated" in this manner, and finds the "run-off" much improved. The disked surface was thoroughly rolled and the stock were driven over it many times. Channels must be delved to drain this

A Good Water Supply. (Mr. L. Barratt's new dam, Ouyen.)

area, and especially to tap any road surface available. Attention is necessary from time to time to see that they are not being silted up.

The drains should pass through a small excavation just before entering the main dam, so that the water will deposit its silt. The evaporation is so high that shallow dams are useless. The "spoil" or excavated dirt should be placed completely round the banks to lessen evaporation. Some, including Mr. Brown, of Carwarp, have gone to the length of partially roofing the dam with a straw roof. In this way it is found that several feet of water are saved annually. The water from the drains is best carried to the dam by means of a pipe through the bank of the dam.

The total capacity of the water storage for a Mallee farm should be at the very least 5,000 cubic yards. It is important to batter the sides of the dam carefully, and to provide a chute for the water to flow down the sides at the point of entry. This prevents erosion and con-

sequent silting. A typical illustration of what happens in the Mallee when no chute is provided as shown in the picture on page 203.

On no account should stock be permitted access to the dam, as they break down the sides, pollute the water, and, if they swim in it, will carry off appreciable quantities on their hides. Sheep are, however, less objectionable, and may help in puddling a dam which is not holding well. Dams of less than 2,000 yards capacity are practically useless in the Mallee. The excellent provision for water made by Mr. Gniel was described in detail last year. Mr. Barratt has put down a fine new 2,900-yd. dam, with concrete chute. Mr. Lodwick's dam has scoured at one corner because of the failure to provide a chute. In all of these dams the stock are not permitted to enter, and are provided with water by means of a windmill.

Sheep in Shelter Belt of Native Pines. (Mr. R. C. Gniel, Walpeup.)

Fodder Conservation.

The fodder reserves on the competing farms this year were a marked improvement on those of the preceding year. Then there were some competitors who had little or no reserves at all. Four out of five competitors this year had stacked from 150 to 160 tons of hay—a sufficient quantity for two years' supply. The hay, however, in several cases was not of the best quality, and sufficient precautions to preserve it from mice and weather had not been taken. The poor quality was due to cutting the wheaten hay (the main fodder in the Mallee) on the ripe side. That means that the straw becomes hard and practically destitute of nutriment, while the grain is well developed. Ripe wheat grain has many objections as a food for horses. It has a tendency to overheat the blood, to cause shortness of breath, and even foundering.

It would certainly pay to grow Algerian oats for hay on most Mallee farms. It could be mixed load for load with wheaten hay cut from the

tracks. A nutritious and palatable food is then obtained. Care should be exercised when chaffing over-ripe hay that the grain and the chaff are not winnowed from one another and deposited in separate heaps by the elevator—a fault that was noticed on one of the farms visited.

Mr. Gniel had his hay reserves in stacks carefully roofed and well "hearted up." They were protected from mice by enclosures of plain iron. In addition there were 30 tons of "cocky chaff" preserved in a well-roofed building specially constructed for the purpose. Mr. Gibbons had his hay stacked on elevated stands of pine poles. Mr. Barratt had some exceptionally fine oaten hay.

Sheep.

A pleasing feature of the competition this year was the fact that all the competitors had sheep-proofed fencing and a flock of sheep. Particulars of the returns that may be expected from sheep on a Mallee farm were given in last year's report. Most of the flocks were of rather mixed types, many of them showing evidence of too great a preponderance of Lincoln blood. This is probably due to the fact that many of the flocks have been bred up from a few ewes, and that the use of the Lincoln ram has been persisted in each year.

The class of sheep preferred by the well-informed Mallee settlers is a comeback ewe; and there is no doubt that the preference is a sound one. A quick-maturing lamb, such as is produced by one of the long-woolled or one of the Down breeds on comeback or half-bred ewes, is likely to give the best results. The Mallee farmer should buy a good line of sheep, and after taking two or three crops of lambs from them, replace them with a fresh line.

Mr. Barratt had perhaps the best sheep; they comprised 130 comeback ewes and 103 wethers. Mr. Lodwick had 250 cross-breds and 120 fine comebacks, also 50 lambs. These were all good framed sheep. Mr. Gniel had a smaller flock suitable to his smaller-sized block. They were an exceptionally good line of 50 half-bred ewes with good frames. There were also 20 good lambs. Mr. Gibbons had 300 sheep. He finds comeback ewes the best paying sheep. Mr. Hunt's 300 ewes and lambs were in good condition, but were a more uneven lot.

Conclusion.

To sum up, there is no doubt that Victoria has a splendid asset in her new Mallee settlements. Despite many handicaps, the settlers are winning success. Many of the farms are now well developed and thoroughly organized for wheat-growing and sheep raising. There is a tendency for the primitive methods, applicable only for the first few years of settlement, to persist; but the most successful men are those who have cast them overboard.

With the adoption of up-to-date methods, particularly careful fallowing, the settlements are bound to enter upon an era of steadily increasing prosperity, and will take their place alongside the older-established settlements in the wheat belt. The next decade is sure to witness immense strides in this unique district.

I have to thank the secretary and those who officiated as stewards for their assistance during the work of judging.

SOLDIERS' CROP AND FALLOW COMPETITION, BEULAH, 1920.

Report of the Judge, Mr. G. Mather, Field Officer, Department of Agriculture.

I have much pleasure in forwarding my report of the judging of the Soldiers' Crop and Fallow Competition recently conducted by your society.

Competitions of this character should prove most instructive to returned soldier settlers and others in your district, especially if organized in such a way that details of the methods employed in producing the various crops are supplied to the judge. This year many of the competitors were absent from their farms at the time of judging, consequently no particulars were available as to the cropping methods. This has largely militated against the usefulness of the competition.

The wheat crops shown were, on the whole, most creditable, and will be the means of giving the new settlers a splendid start. Some of the crops had been sown on stubble land with success; but this success should not lead sound farmers to adopt this method as a standard. Experience in the Mallee during the past thirty years has shown that careful fallowing is fundamentally important as a preparation for the production of a successful wheat crop in an average year. The sowing of stubble land was, however, quite justified this year, especially in view of the partial crop failure last year and the prospective high price for wheat. Notwithstanding the general success of the stubble crops this year, those grown on fallow have proved most profitable.

Takeall was very much in evidence, and where it has appeared precaution should be taken to thoroughly burn the stubbles and fallow the land carefully, with the object of burying every particle of straw before again sowing to wheat. If a crop of oats can be grown before fallowing, so much the better.

Smut was also seen in many of the crops. This can be avoided by careful pickling with either bluestone or formalin. The correct strength of bluestone is 1½ lbs. to 10 gallons of water, with the time of immersion fixed at three to four minutes. Where formalin is used, the correct strength is 1 lb. formalin to 40 gallons of water, with an immersion for the same time. Neither of these methods will be entirely successful if smutted seed is used, and precaution is not taken to remove all smut balls by skimming them from the pickle, into which the wheat should be poured.

The popular method of pickling frequently does not take the quantity of water used into account. This, however, together with the time and the quantity of pickle used, is an important factor.

Seed and Manure.

Results of departmental experiments conducted over a series of years have given very definite information as to the amount of seed and manure most profitable to apply to a wheat crop. The average amount used in your district could be increased with profit; it is probable that the seeding of 75 lbs. wheat for a mid-season sowing is the correct weight to use, and this should be accompanied by a dressing of 1 cwt. superphosphate per acre. It will be found that the increased dressing of manure will result in the production, on an average, of several

bushels more wheat, which will not only pay for the extra manure, but show a profit as well, especially when the price of wheat is at its present level. An important effect of the manure also is its influence on the pasture which follows the wheat. It will be found that this will increase in proportion to the weight of the manure applied up to reasonable limits.

FALLOW.

The summer fallow, or fifteen months' fallow, has not yet gained much vogue in the Mallee, but the experience in the Wimmera, where increased yields have been induced as a result of its use, is very suggestive, and farmers in your district, who have not already tested it, would do well to give this type of fallowing a trial on portion of the farm. The ploughing may be done from February to April, and then the land worked as an ordinary fallow. By employing the teams earlier in the year for the portion summer-fallowed, the work of fallowing is better distributed. The results of the judging are appended.

FALLOW COMPETITION.

Name.	Moisture.	Mulch.	Cultivation.	Weeds.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
P. J. Lawlar	25	25	25	24	99
V. Smith	25	25	24	24	98
Annear Bros.	25	25	24	23	97
T. A. Millar	25	23	24	24	96
— Wheatland	23	24	24	24	95
H. George	25	25	20	24	94
W. Shannon	25	23	23	20	91
Jones and Co.	25	23	22	20	90
— Kemp	20	20	23	20	83
J. McIntyre	25	18	18	22	83
R. Kennedy	25	20	22	15	82
C. Hunt	25	23	18	14	80
C. Blight	25	23	15	15	78
J. W. Ellison	25	25	10	15	75
— Crockford	25	18	10	10	63

CROP COMPETITION.

Name.	Yield.	Purity of Type.	Weeds.	Disease.	Level Character.	Total.
Possible Points	**35**	**20**	**15**	**15**	**15**	**100**
W. Bickett	26	17	14	15	15	87
— Goulay	28	18	10	15	14	85
V. Smith	28	18	12	10	14	82
T. A. Millar	26	18	12	10	14	80
— Kennedy	30	18	10	10	10	78
H. George	24	16	10	13	13	76
W. Shannon	26	12	10	15	15	78
— Marshman	26	17	13	8	12	76
— McIntyre	20	18	8	13	12	71
Jones and Co.	22	17	8	10	12	69
J. W. Ellison	22	15	10	10	10	69
C. Hunt	22	12	8	5	15	62

NEW ZEALAND FLAX.

(*Continued from page* 156.)

By J. Farrell, Orchard Supervisor.

Fostering the Fibre Industry.

It is now plain enough that Australia, both as regards soil and climate, as well as being eminently suitable for the production of fibre used in the manufacture of the finer fabrics, is also unquestionably adapted for the cultivation of that used in making rope, binder-twine, and other cordage. The necessity for jealously guarding our established industries and fostering those in the incipient stages to provide for local requirements, so that we may not be obliged to rely on far-distant and uncertain sources for supplies, became amply apparent during the Great War period. Because of the war-time experience much has been done under Government patronage by private and co-operative effort to meet local requirements, but incalculably more remains to be accomplished to insure Australia's industrial self-dependence. Adequate supplies of rope and binder-twine, &c., are essential to Australia's industrial life, and it may now be reasonably assumed that the necessary supplies of these and a considerable surplus for export could be easily and profitably produced in the Commonwealth.

Our agricultural, horticultural, pastoral, mining, shipping, and other industries demand ever increasing supplies of these essential requirements; therefore, it would not be rash, or premature, to advocate the further necessary Government bounty with a view to establishing the fibre industry on staple and commercial lines, so that our rope and cordage manufacturers would be enabled to secure the whole of their supplies within the Commonwealth.

Reports of a possible future scarcity of Manila fibre, which has been in strong competition with that of the Phormium, are current. The possible scarcity is attributed to the high cost of living, the low returns obtained by the operators, and to the primitive machinery employed in treating the former fibre. The quantity of Sasil fibre available from Mexico and East Africa during recent years is said to be much less than that offered formerly, and this, taken in conjunction with the reports previously mentioned, affords further evidence as to the possibility of profitably producing Phormium fibre in Australia.

In years gone by, the possibilities of profitably cultivating *Phormium tenax* for fibre were usually discussed in an atmosphere of pessimism, which during recent times has changed to one of subdued optimism. However, Mr. Alfred Seifert, of Palmerston North, writing on the great potentialities of *Phormium tenax* as a farm crop, in the *New Zealand Journal of Agriculture*, February, 1921, clarifies the position by giving figures which show the quantity and value of fibre

obtainable from 100 acres of land, as compared with the returns from dairying on a similar area of the same class of land, as follows:—

"It is unfortunate that farmers have not yet realized what an extremely valuable plant we have in our New Zealand flax (*Phormium tenax*). I am confident that suitable land growing Phormium systematically will yield a greater return that when used for any other method of farming that can be carried on in a fairly large way. I am looking forward to the day when New Zealand will export an average of 50,000 tons of Phormium fibre per year. This quantity of hemp could be produced from about 47,000 acres of land.

The following I consider to be a fair comparative statement of the returns from land growing flax and from the same class of land used for dairying. The statement shows the returns based on the highest and the average prices of hemp and dairy produce during the last ten years:—

RETURN FROM 100 ACRES GROWING FLAX.

—	Sold at Highest Price during Last Ten Years, £3 per Ton Royalty.	Sold at Average Price, £1 per Ton Royalty.
	£ s. d.	£ s. d.
Flax-leaf sold on royalty, 900 tons	2,700 0 0	900 0 0
Additional if flax cut and delivered to a mill by grower	900 0 0	900 0 0
Totals	3,600 0 0	1,800 0 0

RETURN FROM 100 ACRES USED FOR DAIRYING.

—	Sold at 2s. 6d. per Pound for Butterfat plus 3d. for By-products.	Sold at 1s. 3d. per Pound for Butterfat plus 3d. for By-products.
	£ s. d.	£ s. d.
Return to landowner (less amount for share milking) at 140 lb. of butterfat per acre	1,284 0 0	700 0 0
Amount for share milking	641 0 0	350 0 0
Totals	1,925 0 0	1,050 0 0

These figures show that, if the respective produce is sold at the highest figure obtaining during the last ten years, the return per annum for 100 acres growing flax will be £3,600 if the flax is cut and delivered to a mill by the grower, while the return from 100 acres used for dairying will be £1,925. The labour involved in cutting and delivering the flax will be just about equal to the labour of dairying."

Then Mr. Seifert explains that the cost of planting an area of, say, 100 acres in Phormium would not be as much as that of buying a herd and plant for milking; but, although the return from dairying would be quicker, the much larger return derivable from flax would more than compensate for its slower arrival at profit. Then he further writes—

"I estimate that 50,000 acres of good land growing flax will yield per annum 450,000 tons of leaf, giving the following production when milled:—

Hemp, 52,940 tons at £30	£1,588,200
Tow, 8,823 tons at £9	79,407
Stripper slips, 4,000 tons at £7	28,000
	£1,695,607

On this basis, the value of the finished article per acre is £33 16s. Taking the value of the hemp and tow produced, at the highest price during the last few years the return would be over £3,000,000. In these calculations it is estimated that an acre will yield 36 tons every four years, and that 8½ tons of leaf will produce 1 ton of fibre."

The percentages of fibre and tow respectively obtainable from a given quantity of Phormium largely depends on the conduct of the various parts of the machinery when treating the fibre in the different stages of its preparation. The relative amounts of products obtainable from the milled Phormium, taking the figures in Mr. Seifert's estimate, work out at—

Hemp, a fraction over 80 per cent.
Tow, a fraction over 13 per cent.
Stripper slips, a fraction over 6 per cent.

In the opinion of the writer, the percentage of hemp given here is rather low, as compared with that of the other two products. And he considers that 1 ton of fibre from 8½ tons of green leaf, or less than 12 per cent., is also low; consequently, intending planters of *Phormium tenax* as a commercial undertaking would be quite safe in basing their calculations on Mr. Seifert's estimate.

Since the commencement and during the continuance of these articles on *Phormium tenax*, Mr. Esmond H. Atkinson, of the Biological Laboratory, Wellington, New Zealand, has also begun a series on the same subject, the first of which appeared in the *New Zealand Journal of Agriculture*, February, 1921.

Mr. H. B. Murphy claims that the high percentage of fibre as compared with that of tow obtained at Emerald is due to the efficiency of his washing machine in thoroughly bruising the tails in passing between the iron rollers, and that in this manner the stripper slips could be practically eliminated, except, of course, when old, wilted, or dry leaves are passed with the green ones through the stripper.

The table of statistics appearing on page 223, and showing the extent of the Commonwealth import and export trade in rope, fibre,

yarn, cordage, &c., was supplied by Mr. G. H. Knibbs, Commonwealth Statistician, and no further comment is required in this connexion, as the figures therein explain themselves.

Modern Rope and Cordage Manufacture.

Messrs. Geo. Kinnear and Sons, rope manufacturers, whose extensive works are situated at Footscray, Melbourne, secured the whole of Messrs. Nobelius and Son's output of fibre and tow. The buyers speak very highly of the Emerald fibre; they state that it is of first class quality, excellent colour, well prepared from the leaf, and very suitable for all classes of their trade, particularly for the manufacture of the well-known "Emu" brand of binder-twine, which has an average breaking strain of 120 lbs. This strength is essential to the successful operations of modern harvesting machinery, as, of course, binder-twine made of good fibre and well spun is a guarantee against breakages and other delays which farmers often experience in the field. The tow, being of good quality also, is made into lashings, &c., for which purpose it is most suitable.

The business of Messrs. Kinnear and Sons was extensive before the Great War, but the stimulus of that period has caused their trade, import and export, as well as local, to increase by leaps and bounds. The extent of their business may be realized when it is pointed out that their Footscray works now cover an area of about 8 acres, and these works, until the Emerald product came to hand, were operating almost exclusively on imported fibre.

Mr. Geo. Kinnear, father of the present proprietors, left London in 1863 for the purpose of installing machinery in the then existing Victorian roperies to supersede the slow method of hand spinning practised in the old-fashioned rope-"walks." That his mission was highly successful is amply evidenced in the efficient working of the machinery at Footscray and the fine quality of the "Emu" brand of rope and other products of the works.

Spinning binder-twine is made a speciality at Footscray, and the six Plates, 32 to 37 inclusive, illustrate in sequence the different operations involved in making it, from the arrival of the fibre at the works until the twine is "balled."

The first operation is that of cutting the bands of the bales and liberating the hanks, as shown in Plate 32. The fibre in this state is known as the raw material of the industry. The portions of the hanks which have been doubled up under pressure in baling are then softened by being run through the heavy fluted rollers of the "batching" machine, as shown in Plate 33, and at the same time the fibre receives a dressing of whale oil. The fibre is then pieced out in handfuls, as also depicted in the illustration. Thus the softening and lubricating operation improves the spinning quality of the fibre, and causes the yarns and fibres in the finished rope or twine to draw evenly and take a proportionate strain. In the next process the fibre is thrown endwise on travelling feed-sheets, by which it is drawn through the "hackling" or combing machine, as illustrated in Plate 34. By this

Plate 32.- Opening Bales of Fibre for "Batching."

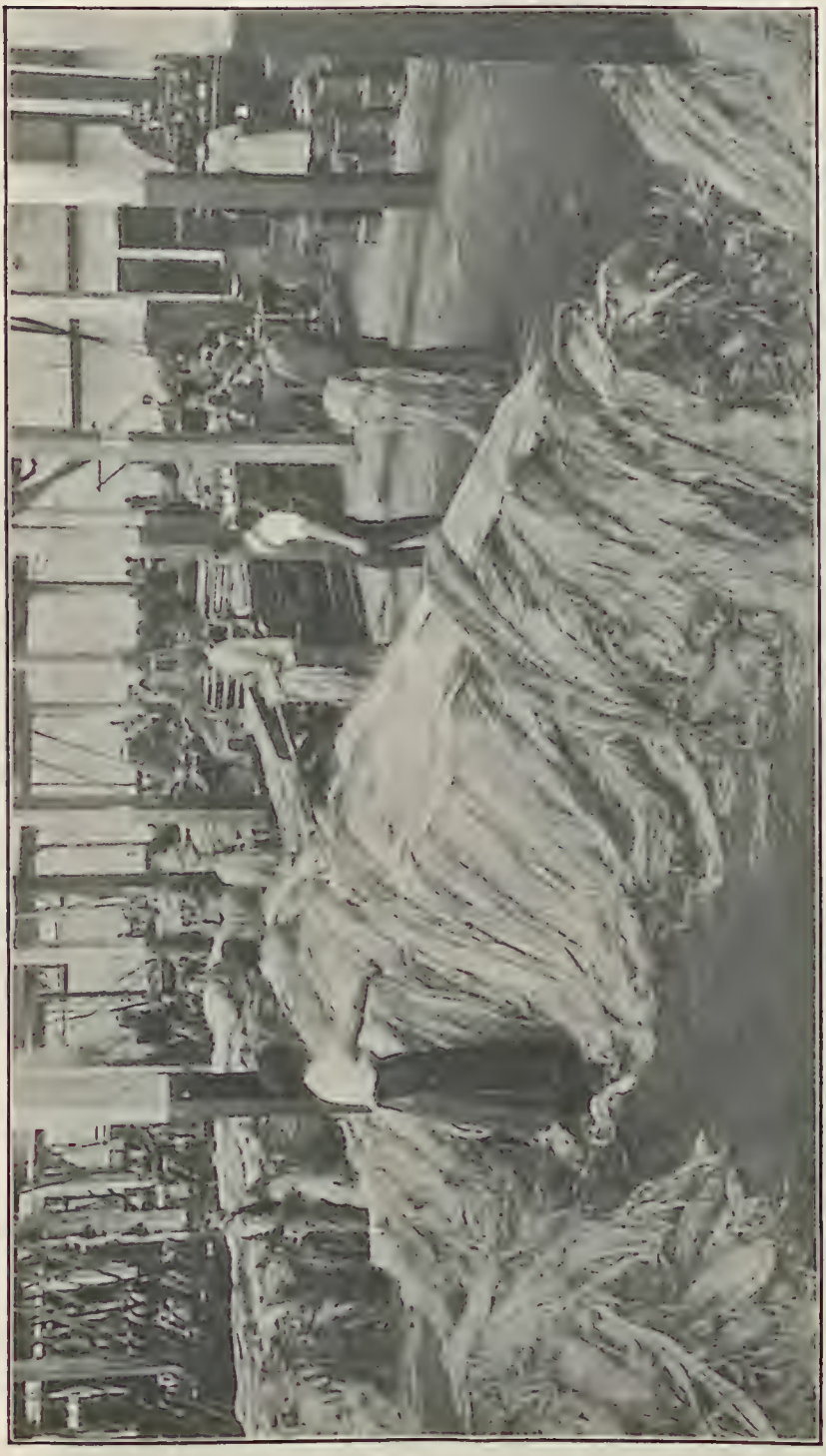


Plate 33.—Batching Fibre for Binder Twine.

Fallowing on Heavy Soils.

The success of summer fallowing and the more even distribution of the work in so doing has led to its popularity throughout the Wimmera, and it is the exception to meet with a farm where at least a portion of the land is not summer-fallowed.

While there is a general similarity in the methods employed in working the fallows, there are occasional minor variations in methods which lead to wide differences in results.

It is frequently noticed that one farmer will bring his fallow into excellent condition with a far less amount of work than another. A case in point is the fallow exhibited by Mr. E. G. Nuske. This was in perfect condition, and though it received six harrowings altogether, it had been but twice worked with the cultivator—given in succession during October.

A fault most commonly met with is an insufficient depth of mulch. In order to afford protection to the underlayers during summer and autumn months, it is necessary that this covering or mulch should be 2½ inches deep. If the depth be less the ground in a normal season will crack in autumn, and big losses of moisture through evaporation occur. This is a point that has to be closely watched when the spring harrowings are given. The harrows are very effective in consolidating the underlayers, caused by the fine particles of soil running down to the points of the tynes, where they quickly settle and bind together. When it is intended to harrow frequently, it is necessary to make the early spring working a deep one. Mr. Nuske's success is due to this. In cultivating twice, the second immediately after the first one and across it, be worked deeply—a good 3 inches—so that after the subsequent harrowings, not only was the fallow well consolidated below, but a good depth of mulch still remained to prevent evaporation.

The combined cultivator drill is becoming a very popular implement for working the fallow, and is specially adapted for late spring workings. For this purpose the 4-inch points are used. These deal effectively with young weeds, and at the same time cut the mulch out to the required depth without opening up the soil to the same extent as the scarifier, while the finely-ridged surface left after working prevents the fallow being beaten down by heavy rains—a feature which was noticeable on many Wimmera fallows this season. These fallows had been harrowed after rain in November, but heavy rains a fortnight later had flattened the surface badly, and, occurring in the middle of hay carting, time could not be spared to give the harrowing which was needed to prevent the fine surface from settling down.

I desire to thank the President and officers of the Society, especially the Secretary, Mr. C. Bennett, for the arrangements made in connexion with the judging, which, with the co-operation of the competitors, enabled the work to be carried out so successfully and pleasantly.

Plate 35.—"Finishing," Drawing Frame.

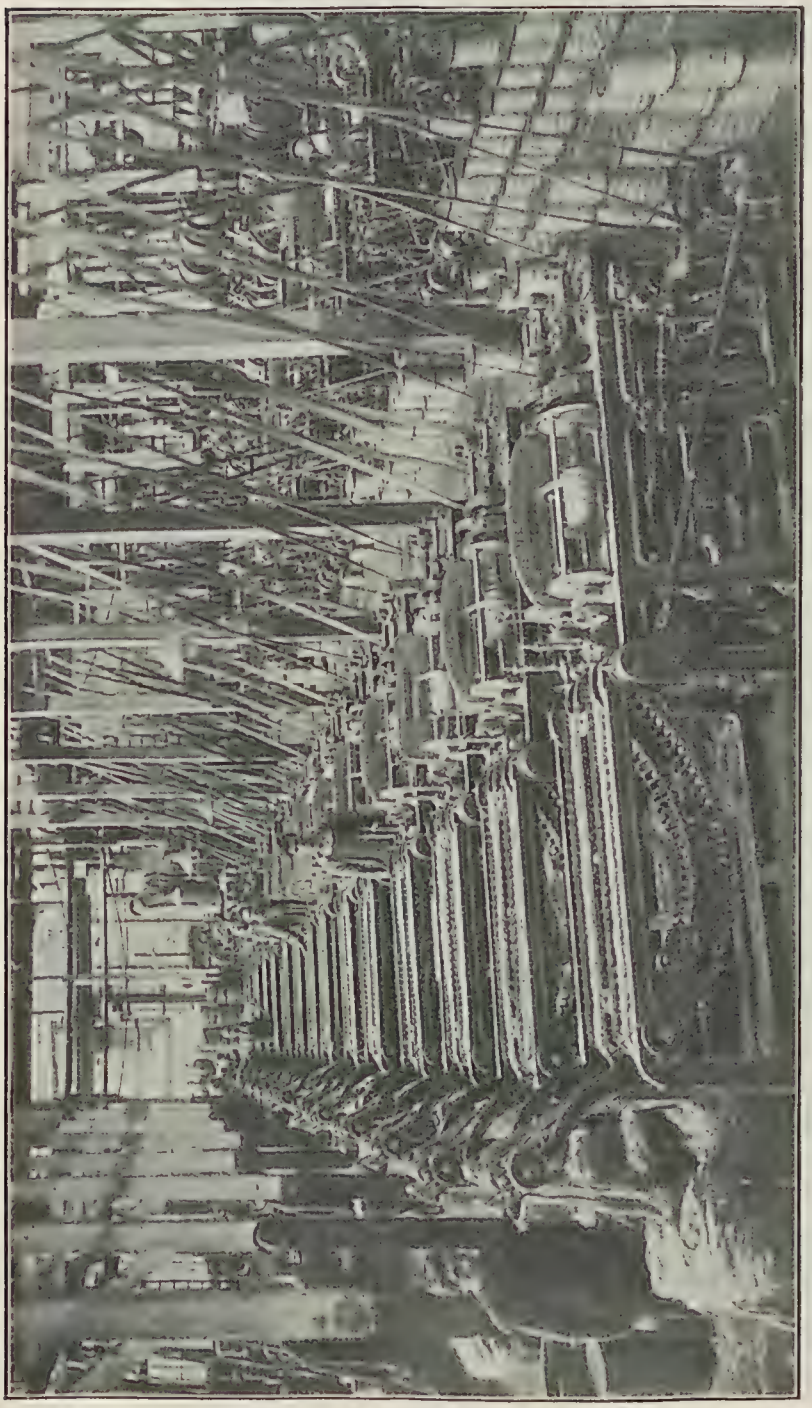


Plate 36.—Spinning Binder Twine.

Plate 37.—Balling Binder Twine.

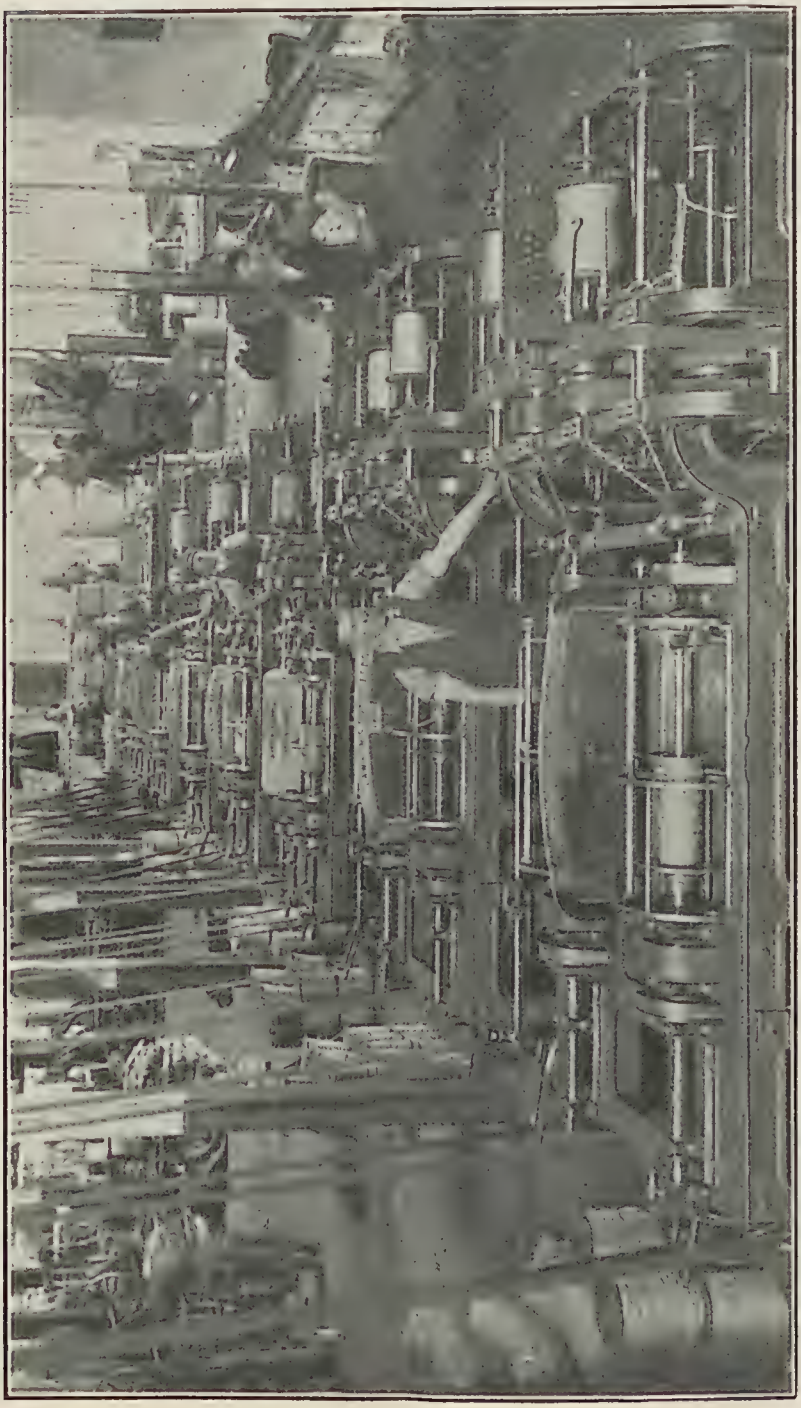


Plate 38.—Machines for Making Lashings, &c.

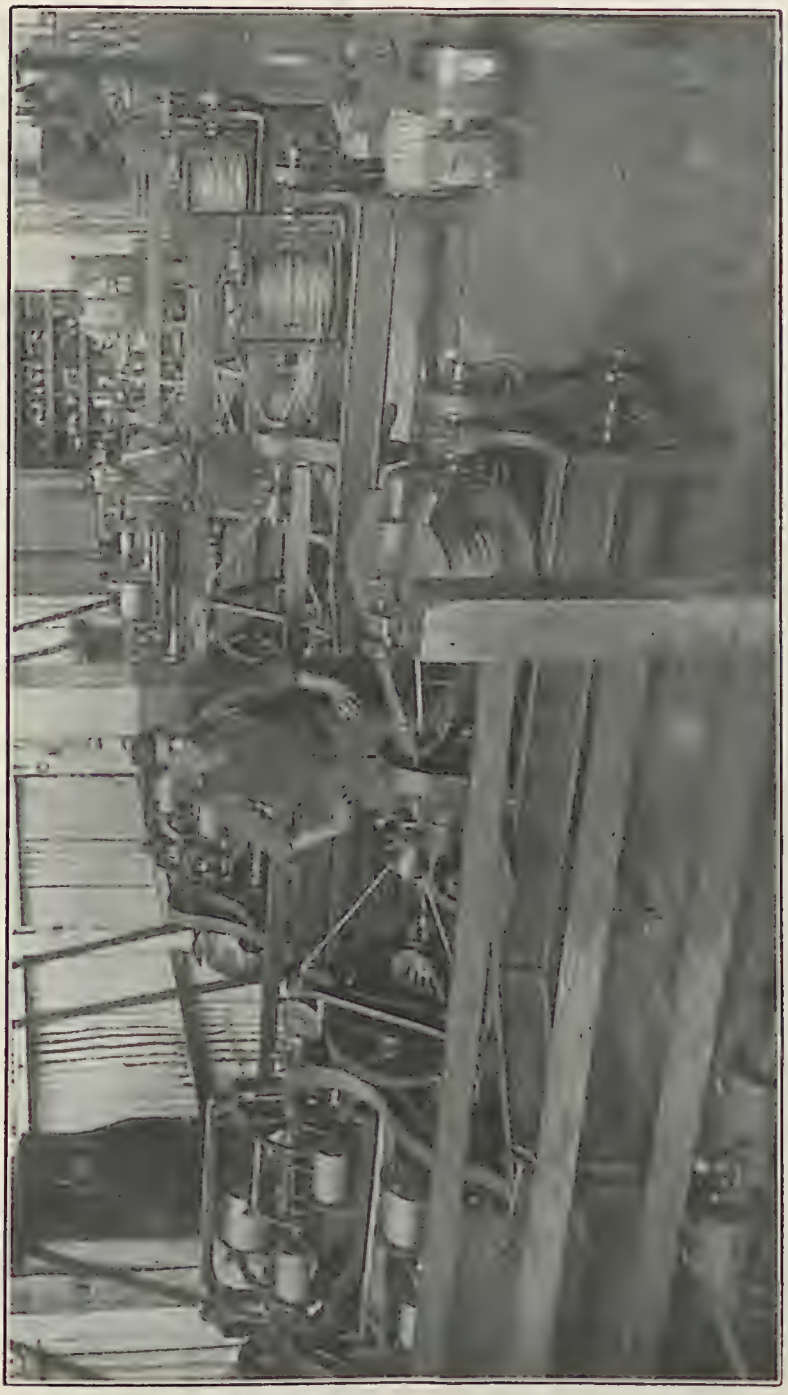


Plate 39.—Machines for Making Smaller Sizes of Rope.

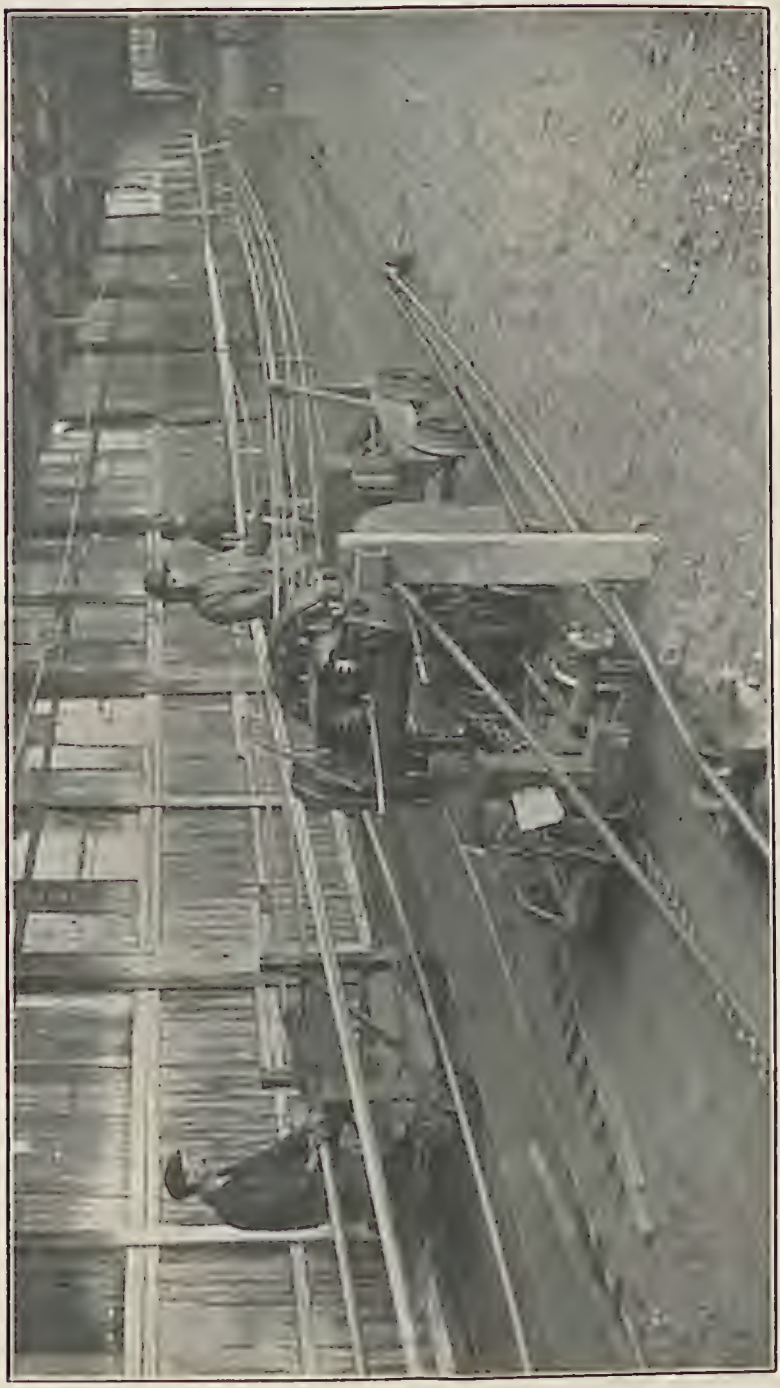


Plate 40.—In the Rope-walk; Hauling and Laying-up Rope; The Finished Article.

means, the fibres are made to straighten, parallelize, overlap each other, and form into "sliver," which is like a rope, except that it is not twisted, and finally it is discharged from the finisher, Plate 35, into cans for transmission to the spinning machines. These draw the "sliver" from the cans, Plate 36, give it the necessary twist, then it is passed over "winders," double-reeled, and "balled" on an ingenious machine into its familiar shape, as depicted in Plate 37.

The machines appearing in Plate 38 are for making lashings mostly from inferior fibre or tow spun into yarn as described, and those shown in Plate 39 are the kind employed for making the smaller sizes of ropes.

The rope-walk, as shown in Plate 40, still remains for the manufacture of the larger ropes and cables; but, instead of the operator walking as formerly, the journey is made by vehicle, while the yarn is spun by machinery. The bobbins of yarn are mounted on a bobbin-bank or frame, constructed so as to carry a large number of them. The yarns are then drawn off down the whole length of the rope-walk, through separate holes in a register plate, and through sizing tubes, and attached to a hook on the "traveller," on which a man is seated, and which travels along the walk by means of a ground-rope, draws out the yarns, and twists them into strands. The strands are combined into a rope by being attached to one hook of the "traveller," and so twisted in a contrary direction to that of the strands that the natural tendency to untwist in one part is counteracted by the same tendency in another. A comprehensive article on Messrs. Kinnear and Sons' rope works appeared in *The Australian Manufacturer*, 25th September, 1920.

As bearing on the question of the relative durability of ropes made from New Zealand and other fibre, says Hector, "We have the distinct evidence of Commander Lewis, of the United States steamer *Resaca*, that Phormium rope which had received a slight dressing of whale oil in the manufacture, and which was rove off the tacks, sheets, staysail, halyards, jib-sheets, whips, &c., on a wet and excessively stormy voyage from Auckland to Valparaiso, lasting 54 days, was considered by the master of the vessel fully equal to any Manila he had ever used."

Further evidence as to the excellent quality of Phormium rope is supplied by Captain Manning, who experimented with 2½-in. and 3-in. samples as far back as 1870. He used these as burton-falls in taking the cargo in (12,000 tons weight and measurement) of the *Dragon*, and that on the completion of her loading he found the rope as good as new, and quite fit to take in another cargo, which is most unusual. It appeared to stand the friction of lowering goods better than either Manila or hemp. It could not have a fairer trial, as during the whole of the ship's loading it was exposed to extremes of wet, frost, and snow, which did not cause any alteration in its appearance, as it neither swelled nor got "long-jawed," nor was the lay of the rope disturbed, as is generally the case, more especially with Manila; in fact, it stood the hard work better than any rope he had ever used.

Ample evidence has been brought to show the desirability of fostering it, and the writer can now do no more than wish the fibre industry a prosperous future.

Commonwealth Imports.

Year.	Fibre—Flax and Hemp including Phormium Tenax.		Yarns.		Reaper and Binder Twine and Yarn.		Rope and Cordage n.e.i., including Sliver, Cordage with Metal Core, Macrame Twine, Fleece Thread; Brushmakers' and Mattress Twine, Roping, Seaming, and Shop Twine; Halters and Articles n.e.i. manufactured from Cord or Twine.
			Flax.	Hemp.			
	Tons.	£	£	£	Tons.	£	£
1915–16 ..	10,769	396,858	15,571*		561	26,508	92,339
1916–17 ..	8,004	371,144	19,298*		609	43,720	159,664
1917–18 ..	9,024	575,392	24,638*		298	24,518	177,774
1918–19 ..	5,097	293,066	5,443	5,632	254	20,256	294,681
1919–20 ..	7,420	367,005	1,371	5,301	134	17,297	187,442

Exports.

Year.	Fibre—Flax and Hemp.				Yarn, Jute, Hemp and Flax.		Reaper and Binder Twine and Yarn.				Other Cordage including Manufactures of Cord and Twine.	
	Australian.		Other Produce.		Australian.	Other Produce.	Australian.		Other Produce.		Australian.	Other Produce.
	Tons.	£	Tons.	£	£	£	Tons.	£	Tons.	£	£	£
1915–16	..	..	1	46	..	6	..	..	..	..	10,831	7,924
1916–17	..	..	9	509	744†	2,217†	247	15,107	..	..	29,465	6,571
1917–18	..	..	75	1,503	35†	1,849†	871	64,619	..	..	40,061	11,553
1918–19	9	985	40	2,407	44†	1,513†	1,022	82,845	..	5	84,995	6,176
1919–20	62	12,711	29	1,664	..	1,327†	475	28,941	..	..	72,619	20,646

* Including jute. † Yarns and vegetable fibre.

Note.—Where quantity is not stated it is not available.

PEACH GROWING IN VICTORIA.

(Continued from page 175.)

IX.—PRUNING.

By A. G. McCalman, Orchard Supervisor.

The first winter's pruning should be given soon after the trees are planted, preferably before the buds swell. The operator should provide himself with a good pair of secateurs, such as the "Rieser" or "Mexeur," and the blade should be brought to a keen edge on a whetstone. A clean cut will heal rapidly, whereas one made with a blunt instrument will take much longer to heal over and the wood below the cut is liable to die back, and this will prove a source of weakness in the future.

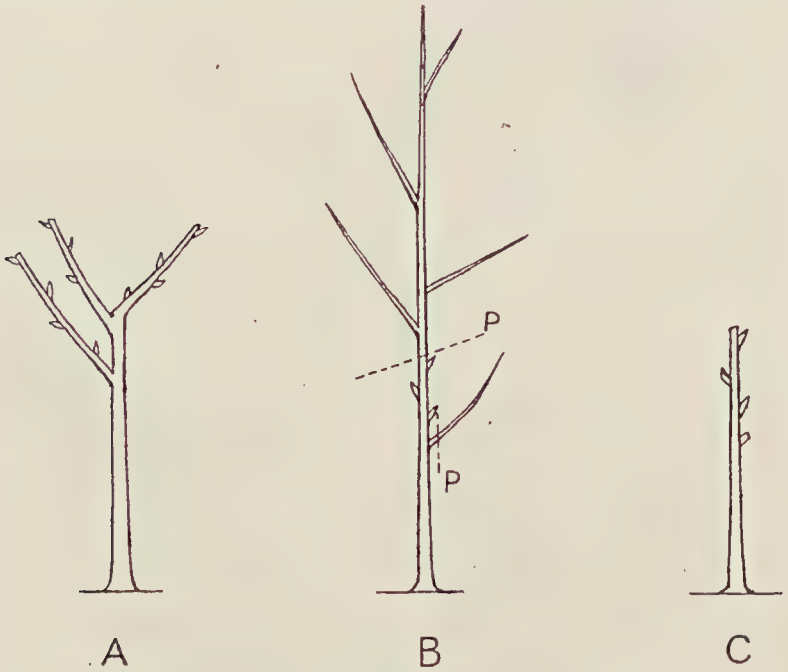


Fig. 18.

A well-pruned young tree. Badly formed head. (Prune at dotted lines P.) Same tree as B properly cut back.

If the tree to be pruned has been well shaped in the nursery, the operation is simple. Three well-grown limbs spaced at fairly even distances apart round the butt should be retained and all other growths cut clean away. These three limbs or leaders should then be shortened back to a length of from 3 to 6 or 7 inches, cutting them just above buds pointing outwards.

The tree would then appear as in Fig. 18A, and during the spring and summer the terminal buds and those just below will, under normal conditions, grow into strong shoots from which leaders may be chosen in the following winter. Often, however, nursery trees are badly

shaped. A type frequently met with is that sketched in Fig. 18B, in which there is one strong central shoot with only weak lateral growths instead of well defined limbs.

In this case the head should be removed, the cut being made, if practicable, just above the highest of three well-developed buds on the

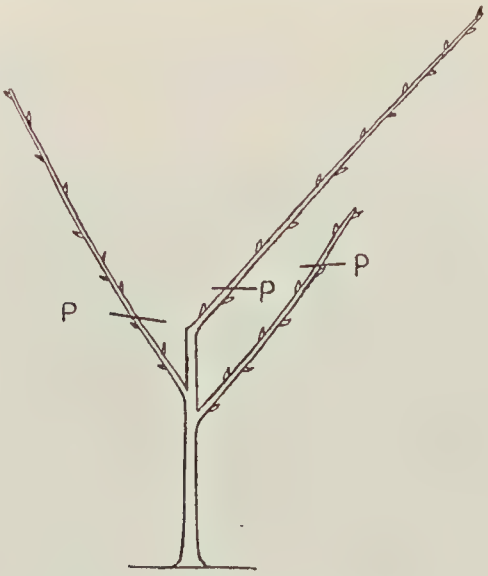


Fig. 19.—A Type of Nursery Tree.
(To obtain a well-balanced head, tree should be pruned at P.)

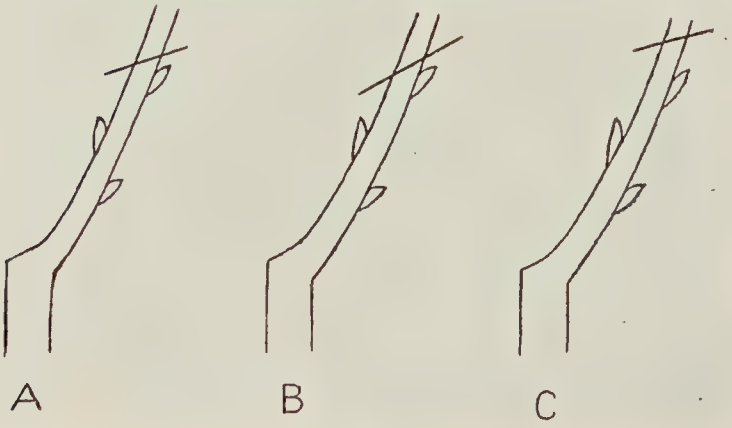


Fig. 20.
A. Correct cut. B. Cut too sloping. C. Cut too far from bud.

stem (see Fig. 18c). Any growths below these buds should then be removed. These buds will grow into strong shoots, and form a well-shaped head. In some cases the only buds available on the main stem

are at the bases of lateral growths. The treatment in such cases is simply to remove the laterals. Trees with very long stems should be avoided, and when the head has been formed too high in the nursery it is better to cut it off at a height of from 12 to 18 inches from the ground, provided buds are available to form the new head. A short stemmed tree is more vigorous than a long stemmed one; it is safer

Fig. 21.—One-year-old Tree, Unpruned.

from the wind; the operations of pruning, picking fruit, and spraying are more easily performed, and the stem, being better shaded from the sun, is less liable to injury by sun-scald.

Fig. 19 shows a type of nursery tree frequently met with, having two strong limbs suitable for leaders and a weak one below. To

obtain a well-balanced head in such a case, the strongest limb should be cut back very severely, the next strongest left a little longer, and the weakest left so long that its highest point will be above the other two. If very weak it may be left unpruned.

This is contrary to the usual practice, which is to cut the weakest limb harder than the others, the argument being that hard cutting induces a strong growth. It should be remembered, however, that the sap always flows first to the highest point in a tree in the same way that water rushes to the lowest point in a drain; it also flows more freely in a limb of large diameter than in one of small diameter. It

Fig. 22.—Same Tree as in Fig. 21, Properly Pruned.

is obvious, therefore, that a weak limb, if cut severely, is in a bad position for receiving an ample supply of sap, as the hard cutting would reduce its height far below that of its stronger neighbours, and its smaller diameter further restricts its sap flow. By leaving the weak limb longer than the others, and having its terminal point above them, this point receives the sap flow first, and thus obtains a start on its rivals, so that by the end of the summer it will have probably become as strong as the others. If the growing points of the strongest shoots of an unevenly growing tree are pinched off in the summer, their growth will be retarded for a while, and this will assist in obtaining a well-

balanced head. It is important in pruning young trees to make the cut at the correct angle; the cut should start opposite the base of the bud and finish slightly above its apex. Fig. 20A shows how the cut should be made. In Fig. 20B the cut is made at too sharp an angle. Such a cut takes longer to heal and reduces the flow of sap to the bud.

In Fig. 20C the cut is made at the correct angle, but is too far from the bud. The result of this cut is that the stub left above the bud dies, and the wood will continue to die back past the bud, resulting in

Fig. 23.—Reine de Verges Peach Before its Third Pruning.

permanently dead wood in the centre of the limb. As the trees get older it is less necessary to use the same care in making the cut correctly, and the pruner could not afford the time, but for the first two seasons every care should be taken.

The first season's growth is apt to be uneven, owing to cold winds from the south-west checking the growth on that side of the tree; but if

the weak limbs are again left long, a well-shaped head will be obtained in the third season.

The second season's pruning consists in removing all but four leaders, and those limbs are chosen for leaders which are spaced as nearly as possible at equal distances apart and making a fairly obtuse angle with the butt. If a leader be pointed in too upright a direction it should be cut to a lateral growth pointing in the direction desired. If

Fig. 24.—Same Tree as in Fig. 23, after Pruning.

spreading too much, cut to a lateral pointing in a more upright direction. The extent to which leaders are shortened back will depend on the vigour of the tree; if the growth be weak, fairly severe cutting back is required to induce a stronger growth in the spring.

Fig. 21 is a photograph of a somewhat lop-sided and fairly vigorous tree before receiving its second pruning. Fig. 22 shows the same tree so pruned that the leaders are evenly separated and the shape corrected. It will be seen that the limb on the right has been cut to a lateral (near

its base) which now forms the leader, and that this has been left at its full length. The limb on the left has also been cut to a lateral, the terminal point of which has been left. The two stronger limbs have also been cut to laterals, but these have been shortened back considerably, as otherwise they would soon outgrow the weaker ones. As the tree is too young to carry a crop of fruit, all growths except those left to form the framework of the tree have been removed. Under good conditions this tree will make a vigorous growth during the spring and summer, and the third season's pruning will consist mainly in thinning out surplus growths.

Fig. 23 is a photograph of a tree in the same orchard before receiving its third pruning; and it is plain that the method of pruning adopted has resulted in a beautifully balanced tree. An examination of the leaders on the south-west side of this tree showed that the terminal buds had not been removed—that is, the leaders were not shortened back as they were on the other side of the tree. The pruning of this tree consists in the removal of all strong growths high up in the tree with the exception of those required for leaders, and the thinning out of the laterals throughout the tree. These laterals should be spaced about a foot apart along the leaders, the intervening ones being removed at their junction with the leader. Only short laterals should be retained high up in the tree, as if strong ones be left they obtain too much sap to tend to become leaders; strong laterals may be retained near the base of the tree when they are not in a position to obtain a large supply of sap, and so do not grow too much. The leaders must again be spaced well apart, about nine being sufficient to leave in a tree like that illustrated in Fig. 23.

Fig. 24 shows the same tree after pruning, and the heavy thinning out resorted to at this stage of the tree's growth should be noted. It will be seen (Fig. 24) that the leaders have been spaced well apart and cut to laterals, pointing outward, near their tops in order to increase the spread of the tree and check a too rapid rush of sap to the top. To a beginner this tree probably appears to have been too severely dealt with and to have been practically denuded of fruiting wood, that is, light lateral growths. As a matter of fact, there is sufficient fruiting wood on this tree to carry about a bushel of fruit.

The peach carries its fruit on wood grown in the previous season. The object of the pruner is therefore to obtain a growth of laterals each season to take the place of those which have borne the previous crop.

If the leaders be spaced well apart and run out to light points, the flow of sap to the top of the tree will be retarded, with the result that buds along the leaders will receive a sufficient flow of sap to force them into growth. Thus new laterals will appear in the place of those removed after having fruited.

When thinning out the laterals of a tree in bearing, it is necessary not only to remove the laterals which have carried the fruit in the summer, but to space out the new laterals which are to carry the coming crop. These should be spaced about a foot apart along the limbs. The pruner should be able to recognise at a glance which of these new laterals are capable of bearing fruit and which are useless.

(To be continued.)

WHEAT EXPERIMENT PLOTS.

IN THE WIMMERA.

Last year, a series of experimental plots were laid down by the Department of Agriculture, on the farm of Mr. Walter E. Dahlenburg, at Salisbury. The farm is plain country, with black and red soils mixed. The results, which are set out hereunder, are applicable to large areas of similar country in the Wimmera.

Results.

Variety Plots (all Sown 30/6/20).

Super.	1 cwt. per acre.
Wheat	65 lbs. per acre.
Oats	60 lbs. per acre.
Barley	55 lbs. per acre.
Wimmera Rye Grass ..	20 lbs. per acre.

	bush.	lbs.
1. Gallipoli (new Departmental crossbred)	54	28
2. Penny	52	8
3. Federation	50	0
4. Mac's White	39	48
5. Algerian Oats (on fallow)	49	32
6. Oregon Barley (went down).		
7. Wimmera Rye Grass.		

Manurial Plots (all Sown 30/6/20).

Federation Wheat .. .. 65 lbs. per acre.

	bus.	lbs.		per acre. bus.	lbs.
No Manure	48	16	average	48	..
No Manure	47	44			
½ cwt. superphosphate ..	49	40	"	49	48
	49	56			
1 cwt. superphosphate ..	50	..	"	49	52
	49	44			
1½ cwt. superphosphate ..	50	4	"	49	44
	49	24			
2 cwt. superphosphate ..	49	8	"	47	10
	45	12			

It will be noted that the yields of all the plots are exceptionally good. The variety trials were instructive in showing that Gallipoli and Penny, two comparatively recent introductions into the district, have beaten the standard Federation. Gallipoli has repeatedly demonstrated its capacity to yield heavily for the past four or five years. The crops seen at Nhill and elsewhere show that the wheat is still varying somewhat. The Department has decided, therefore, not to issue any further lots until it is thoroughly fixed. Mac's White is a wheat which

has done exceptionally well in the Northern Mallee districts. It is a tall wheat, which sheds rather freely; but, despite that, farmers continued to grow it in those districts. It is an early wheat, and is one well worth a test in the Mallee round Nhill. That was why it was introduced into the plots, so that Nhill farmers on Mallee land should have an opportunity of obtaining seed. Next year it is intended to try some of the most promising crossbreds from Longerenong College, at Salisbury.

The Oregon Barley promised a heavy yield, but went down. The Wimmera Rye Grass made very vigorous growth.

Manurial Plots.—The results of the manurial plots are something in the nature of a surprise. Superphosphate, in dressings of from ½ to 2 cwt. to the acre, made little difference to the yield. Normally, ½ cwt. will increase the yield by 6 or 7 bushels. Somewhat similar results to those at Nhill were obtained at Longerenong College this year —the first time for eight years.

The cause is probably associated with the abnormally late season experienced. Instead of the wheat ripening off at the usual time, the moist cool weather prolonged the growing period. When the rain came, the wheat which had been manured had finished growing, but the wheat which had not been treated was still green; it was, therefore, able to take full advantage of the favorable conditions which developed late.

In the third week of November, the no-manure plots appeared fully ten to fourteen days behind the plots that were heavily manured. In a normal year, this would have been fatal.

Appended are the average results of the Longerenong plots for seven years:—

No manure—25.0 bushels.
½ cwt. super.—31.35 bushels.

IN THE MALLEE.

The results of the experiment plots conducted by the Department of Agriculture for the past five years in the Mallee districts demonstrate the value of superphosphate when applied in liberal quantities to Mallee lands.

Plots were conducted at Carwarp by Mr. P. G. Stewart, M.H.R., and at Cowangie by Cr. H. F. Hecht. The plots were treated with superphosphate at the rate of 30 lbs., 60 lbs., and 90 lbs. per acre, respectively.

The soil at Cowangie is a fairly rich loam, whilst that at Carwarp is of a light sandy character below the average in quality.

The average yields for the past five years (1916-20) are summarized below:—

—	Cowangie.	Carwarp.
	bush. lbs.	bush. lbs.
Plot 1.—No Manure	22 16	9 26
Plot 2.—Super. 30 lbs.	25 40	14 2
Plot 3.—Super. 60 lbs.	27 27	15 40
Plot 4.—Super. 90 lbs.	27 33	17 4

If the value of wheat for the period under review is taken at 5s. per bushel and superphosphate at the average price of 5s. 6d. per cwt., the net profit from each dressing would be as follows:—

—	Yield.	Increase due to extra manure.	Net profit per acre over and above cost of manure.
	bush. lbs.	bush. lbs.	
1.—Cowangie.			
No manure	22 16	..	..
30 lbs. super.	25 60	3 24	15/6
60 lbs. super.	27 27	5 11	22/11
90 lbs. super.	27 33	5 17	21/11
2.—Carwarp.			
No manure	9 26	..	..
30 lbs. super.	14 2	4 35	21/6
60 lbs. super.	15 48	6 14	28/2
90 lbs. super.	17 4	7 38	33/8

The results demonstrate that liberal applications of superphosphate have been very profitable throughout the whole period, the 60-lb. dressing giving an increased net profit of 7s. 5d. and 6s. 8d. per acre over and above the 30-lb. dressing.

At Cowangie an application of 90 lbs. resulted in an increased profit of 21s. 11d. per acre as compared with 22s. 11d. from the 60-lb. dressing; but at Carwarp, where the soil is of poorer quality, the 90-lb. dressing gave a profit of 33s. 8d. per acre as compared with 28s. 2d. from the 60-lb. dressing.

The results show that over a period of five years liberal dressings of phosphate applied to Mallee lands will enable farmers to obtain average yields, varying from 17 to 22 bushels to the acre, according to the character and quality of the soil.

YIELDS IN NEWER MALLEE.

Wheat Variety Tests.

The results of wheat variety tests in the Mallee districts show that the choice of suitable varieties of wheat for sowing is an important factor in determining profitable crop yields. Frequently the difference between the yields of two varieties, sown on the same field under similar conditions of soil and cultural treatment, is more than sufficient to pay the rent of the land on which the crop is grown.

In the newer Mallee, approximately 450,000 acres of land were sown this year, and it is anticipated that the average yields of this area will be 12 bushels, which would mean a return of 4,800,000 bushels from this new wheat province.

The determination of the most suitable varieties to grow in this belt of territory is important, because of the special soil and climatic conditions of the region. The Department of Agriculture has tested, during the past five years, seventeen different varieties of wheat at two representative centres—Cowangie and Carwarp. Many of these varieties have proved unsuitable for Mallee conditions, and have been discarded. Seven of these varieties remained in the experimental plots this year, and their yields were as follow:—

	Cowangie.	Carwarp.	Average.
	bus. lbs.	bus. lbs.	bus. lbs.
1. Gallipoli	30 46	22 40	26 43
2. Federation	29 22	21 22	25 22
3. Penny	26 32	24 12	25 22
4. Currawa	26 4	21 18	23 41
5. Dart's Imperial	24 50	20 47	22 48
6. Canberra	27 4	18 20	22 42
7. Mac's White	22 43	20 5	21 24

Gallipoli—a new crossbred wheat developed by the Department of Agriculture—gave the highest average yield—26 bushels 43 lbs.

Federation and Penny—varieties extensively grown in Victoria—gave 25 bushels 22 lbs. each, whilst the early maturing Mac's White, a popular Mallee wheat, gave 21 bushels 24 lbs.

The seasonal conditions were somewhat adverse to the early maturing varieties, which show to best advantage in a dry season.

The yields obtained on these plots, which were grown on land somewhat below average quality, give an indication of the fertility of the newer Mallee lands when subjected to good cultural methods.

A farmer who saves a patch of crop for seed which has grown more vigorously than the rest of the paddock is only on the first step of the ladder to improvement. The well-grown patch of crop may have fewer wild oats, and the grain may even be plumper than the rest of his crop, but the improvement is merely due to a little extra soil moisture or fertiliser, to better cultivation or richer soil. Such seed will not produce a uniformly vigorous crop next year, because it still consists of a mixed population. We need to "line up" plants singly for inspection before we are in a position to see what sort of individuals we have for seed mothers; it only needs to be done once to convince the most casual farmer of the existence of many weaklings and sick plants in the average crop. Cut these out, and we are making strides towards higher production.—[Extract from an article on The Elimination of the Unfit, in the *Agricultural Gazette of New South Wales*, April, 1921.]

THE OAT CROP.

Results of Departmental Experiments.

Last year the Agricultural Department resumed its experiments in the Western District which had been discontinued during the war. The results of fertiliser tests with oats carried out on the farm of Mr. James Oman, Lismore, are now to hand.

A series of plots of Algerian oats, approximately five-eighths of an acre each were sown with various manures. Notwithstanding that the oats were sown on stubble land, some excellent yields were obtained. Increases up to 6.9 bushels per acre were obtained by the use of fertilisers.

The plots were sown at the rate of 1½ bushels of oats per acre on the 26th May, 1920.

Results.

	Yield per acre.	Increase due to Manure.	Value of Increase at 2s. 6d. per bushel.
	bush.	bush.	
No manure	36·7	..	..
Super., 1 cwt.	42·7	6·0	15/–
Basic slag, 1 cwt.	37·4	0·7	1/9
Basic phosphate, 1 cwt.	39·2	2·5	6/3
Basic slag, 2 cwt.	40·8	4·1	10/3
Super., 2 cwt.	43·6	6·9	17/3
Bonedust, 1 cwt...	37·5	0·8	2/–
Super., 1 cwt., and lime, 1 cwt. ..	40·3	3·6	9/–
Lime, 10 cwt.	35·9	0·8 (decrease)	2/– (loss)
Super., 2 cwt., and lime, 10 cwt. ..	40·2	3·5	8/9

The following table shows the profit per acre which has resulted from the principal fertilisers tried:—

	Value of Increase at 2s. 6d. per bushel.	Cost of Manure.	Profit due to Manure.
No manure	..	..	..
Super., 1 cwt.	15/–	5/6	9/6
Basic phosphate, 1 cwt.	6/3	5/–	1/3
Basic slag, 2 cwt.	10/3	11/–	–/9 (loss)
Super., 2 cwt.	17/3	11/–	6/3

The results show that, calculating oats at 2s. 6d. a bushel, superphate applied at the rate of 1 cwt. per acre has proved the most profitable manure. The profit resulting from its use is 9s. 6d. per acre greater than where no manure is used.

Manures of the basic type have not proved nearly so profitable, and contrary to expectations the use of lime at Lismore has not resulted in any benefit during the first year of its application.

Further Results of Experimental Plots.

The results of manurial experiments with oats conducted by the Department of Agriculture at the farm of Mr. Geo. Kerr, Strathkellar, are now to hand.

The soil is a good type of dark loam. A series of plots of Algerian oats, each half an acre, were sown with various manures. Nothwithstanding that the oats were sown on stubble land, some exceedingly heavy yields were obtained. Increases up to 26 bushels per acre were obtained by the use of fertilisers.

The plots were sown at the rate of 1½ bushels per acre on the 14th May:—

Results.

Manure per acre.	Yield per acre.	Increase due to Manure.
	bush.	bush. per acre.
No manure plots..	50·6 (average)	..
Superphosphate, 1 cwt.	62·6	11·8
Superphosphate, 2 cwt.	77·4	26·6
Basic slag, 1 cwt.	56·9	6·1
Basic slag, 2 cwt.	72·4	21·6
Bonedust, 1 cwt.	68·3	17·5
Super., 1 cwt., and lime, 10 cwt.	69·9	19·1
Super., 2 cwt., and lime, 10 cwt.	66·4	15·6
Lime, 10 cwt.	50·1	·7 (decrease)
Basic phosphate, 1 cwt.	52·2	1·4

The following table shows the profits per acre which have resulted from the principal fertilisers tried:—

Manure per acre.	Increase.	Value of Increase at 2s. 6d. per acre.	Cost of Manure.	Profit per acre due to Manure.
	bush.			
No manure	..	..	..	..
Superphosphate, 1 cwt. ..	11·8	29/6	5/6	24/–
Superphosphate, 2 cwt. ..	26·6	66/6	11/–	55/6
Basic slag, 1 cwt.	6·1	15/3	5/6	9/9
Basic slag, 2 cwt.	21·6	54/–	11/–	43/–
Basic phosphate, 1 cwt. ..	1·4	3/6	5/–	1/6 (loss)

The results confirm those obtained from the Lismore plots. They show that superphosphate is the most profitable type of manure to apply for oats.

Valuing the oats at 2s. 6d. a bushel and the superphosphate at £5 10s. a ton, an application of 1 cwt. of superphosphate has resulted in a net profit of 24s. per acre. When 2 cwt. of superphosphate was applied the profit due to the manure was 55s. 6d. per acre.

Manures of the basic type did not do so well. Of these, basic slag (Thomas Phosphate) was best. Basic phosphate, a manure to which attention has recently been directed, was not satisfactory.

ROTATIONS FOR HAY GROWING.

Since 1913 the Department of Agriculture has carried out at Werribee a series of experiments with the object of determining the most profitable cropping system for the production of oaten hay. Four different methods of cropping have been tested for a period of eight years, namely, (1) Hay grown continually; (2) Hay alternating with bare-fallow; (3) Hay after barley and bare-fallow; (4) Hay after barley and peas.

Considerable differences in the yield of the main crop (oaten hay) were observed in these varying rotation systems. The yield of hay for the 1920 season and the average returns for the past seven years are summarized in the accompanying table:—

Rotation System.	Yields of Oaten Hay. Yield 1920.	Average yield last 7 years.
	cwt.	cwt.
Hay continuously	13.9	23.9
Hay after bare-fallow.. ..	51.4	48.3
Hay after barley and bare-fallow	58.9	49.7
Hay after barley and peas ..	26.2	32.5

During the past seven years the yields of hay grown after bare-fallow, and after barley and bare-fallow, have been more than double the yield of the plot on which hay was grown continuously.

Even more significant are the figures showing the net financial returns to be expected from a farm under each of these systems of cropping. These have been worked out for a 300-acre farm treated under each of the four rotation systems. The actual cost of all cultural and harvesting operations has been determined from the records of the Research Farm, and in determining the returns average prices have been taken for all products. The average net profit from such a farm over the seven years, after allowing all costs, including labour, seed, manure, rent of land, interest on capital, &c., was as follows:—

Cropping System.	Average return per year.
Hay grown continuously	£184 per farm.
Hay after bare-fallow	380 „
Hay after barley and bare-fallow ..	314 „
Hay after barley and peas	120 „

From these returns it will be seen that the farm on which 150 acres are sown on a well-worked bare-fallow gives a net profit more than double that of the farm where the whole of the 300 acres is seeded each year.

The average rainfall at Werribee for the period under review was 20.25 inches.

Oaten hay is generally sown on stubble land in Victoria, and the average yield for the State for the past seven years is 1.26 tons. This yield is practically the same as that obtained at Werribee by growing hay continuously. It would appear from the figures given above that this average yield of hay could be greatly increased with profit to the hay-grower by the adoption of a good system of crop rotation.

PASTURE TOP-DRESSING.

During the past nine years the Department of Agriculture has been conducting tests with pasture top-dressing at the Experimental Farm, Rutherglen. They take the form of a series of 4-acre paddocks of virgin natural pasture which are simply top-dressed with various artificial fertilisers in the autumn each year.

For comparative purposes one of the plots is untreated. Sheep are grazed on each of the plots, and the gain in weight determined.

The results for this year are now to hand. They demonstrate that the application of all the manures tested has resulted in a remarkable increase in the carrying capacity of the grass. The following table sets out the results:—

Dressing per acre.	Number of sheep on plot.	Number of days on plot.	Gain in live weight per acre.
Super. 1 cwt.	19	40	145 lbs.
Lime 10 cwt.	20	14	
Super. 1 cwt.	19	40	92½ lbs.
	20	14	
Basic Slag 1 cwt.	19	40	54½ lbs.
	20	14	
Nil	19	40	37 lbs.
	9	14	

The table shows that 39 sheep grazed on the plot treated with lime and superphosphate made a total gain of 145 lbs. per acre. The sheep grazed on the 1 cwt. super. plot gained 92½ lbs. during the same period. The gain on the plot treated with basic slag was 54½ lbs., while those on the no-manure plot gained 37 lbs. during the same period.

The effect of the manure is to markedly improve the bulk, quality, and palatability of the herbage. The weight of grass was increased nearly three times by the dressing of lime and super., and by the superphosphate nearly twice.

A notable feature of the results is the remarkable increase in the percentage of native clovers induced in the herbage on the plots manured with lime and superphosphate and with superphosphate alone. In each case it has been increased from 21 per cent. to no less than 75 per cent. by weight of the total grass.

Produce valued at 25¾ million pounds was raised on the pastures of the State last year, which figure is a record. Now that a decline in prices has set in it is not likely that it will be maintained unless a very definite effort is made on the part of farmers, pastoralists, and graziers to improve the carrying capacity of the grass. The results of the test show how the improvement may be made.

The application of 1 cwt. of superphosphate is not expensive. There are 18,000,000 acres of pastures in the State where the rainfall is over 25 inches annually, to which such a dressing may be applied with marked profit.

Numbers of farmers have given top-dressing a practical test, and they are more than satisfied with the results.

SATISFACTORY RESULTS IN WESTERN DISTRICT.

Figures were recently published by the Agricultural Department relating to the experiments made at the Experiment Farm, Rutherglen. They demonstrated the value of top dressings of artificial fertilisers for improving the grazing capacity of natural pastures in districts where the rainfall is over 25 inches annually. It was shown that by comparatively inexpensive dressings of phosphatic manures applied to the grass land its carrying capacity may be at least doubled.

Further results from the Western District are now to hand. They confirm the results obtained at Rutherglen. At Glenthompson, near Hamilton, sheep were grazed last year on separate plots of native pasture to which applications of various manures had been made last autumn.

At the end of 63 days (the period over which the sheep continued to gain weight) the sheep on the plot dressed with 2 cwt. superphosphate gained nearly three times as much weight as those grazed on the unmanured pastures. When the basic type of phosphate was applied the gain was not quite so great. In this respect the results are similar to those obtained at Rutherglen.

At Glenthompson the manures on the plots grazed were applied in autumn last for the first time only.

Tests were also made to determine the period over which the manure is likely to remain useful. They show that the effect is likely to last much longer than one year.

Both at Hamilton and Rutherglen the manures have induced a marked increase in the percentage of clovers forming the pasture, but at Glenthompson little or no increase in the clovers has so far been noted. On the other hand, a very definite improvement in the palatability of the dry feed has been effected on some of the manured plots. It was greatest on the land manured with 10 cwt. lime and 2 cwt. super. It was found that sheep given the choice of the whole of the manured pastures selected and entirely disposed of the grass on this plot before attacking that on any of the others.

These results show that a ready means is available to graziers, dairymen, and others who desire to profitably increase the carrying capacity of their pastures. There are 18,000,000 acres in the State to which these results may be applied.

An attempt was made in the State of Oregon, U.S.A., in 1919, to determine whether the apparently greater yielding capacity of Hard Federation as compared with Early Baart (one of the best known Oregon varieties) was due to a lower water requirement. As a result of a transpiration experiment, it was found that while Hard Federation produced a crop of grain on 1,551 lbs. water, Early Baart required 2,422 lbs. Relatively to the wheat of other countries Australian wheats have a very low water requirement—a character no doubt connected with the popularity of wheat as a crop in this country.

REARING CHICKENS ON THE COLONY SYSTEM.

(*By W. C. Rugg, Poultry Foreman, State Research Farm, Werribee.*)

The value of portable colony houses for rearing chickens is not fully realized by a large number of poultry-keepers, and there is no doubt that, if it were better understood, it would be far more extensively adopted.

To lay the foundation of future profits, it is not only necessary to supply chickens with liberal quantities of good food, but they must also have suitable conditions and environment. Given these, quick growth and good development will result, with higher egg-production from the pullets, and better prices for the cockerels will be secured.

The colony system is more economical in regard to accommodation, labour, and food. After leaving the brooders, chickens reared on this system thrive much better than those enclosed in small, bare yards. In the latter, the ground gradually becomes tainted, not offensively so perhaps, and it may not be noticed; still it affects the air close to the ground on which the chickens live. After a few days they know every foot of the ground, and, becoming weary with the monotony, will not run about as they would if given greater opportunities of finding natural food, such as insects, grubs, seeds, &c., and a variety of green food. By keeping the birds moving about, they will attain good health and proper development.

The Colony House.

Portability, adaptability to weather conditions, low cost, and simple construction are the features of the colony poultry-house illustrated in this article. Such a house has been used by me for a great many years with highly satisfactory results. Its dimensions are 6 feet x 5 feet, x 4 feet high, built tent shape. A house of this size will accommodate 50 chickens, 10 or 12 weeks old, for from 6 to 8 weeks, when the number should be thinned down by the removal of the most forward pullets to their permanent laying quarters.

In this design provision has been made so that the house can be conveniently used for laying hens after the chicken season is over, and it will provide accommodation for from 20 to 24 layers. Portion of the back of the house, being hinged, can be lifted up, and four nests, made from kerosene tins cut as directed below, fitted in. The entrance to the nests is from inside the house, thus the hinged portion forms the lid to the nests, and can be lifted when the eggs are being gathered. The width of the back of the house allows space for six kerosene tins—four nest boxes, one for a water tin, and one with separate spaces for shell grit and charcoal. These tins all rest on the frame of the house, and, therefore, no inconvenience is experienced when shifting the house. The building is so light that it can easily be shifted by two children, ten or twelve years of age, and its shape is such that wind, even at Werribee, has no effect on it.

I originally used these houses without floors, but now find it advisable to place in them a frame of 2 x 1 battens on edge, and covered with wire netting stretched tight; this frame should fit neatly inside the bottom of the house. The advantages of this frame are, that should

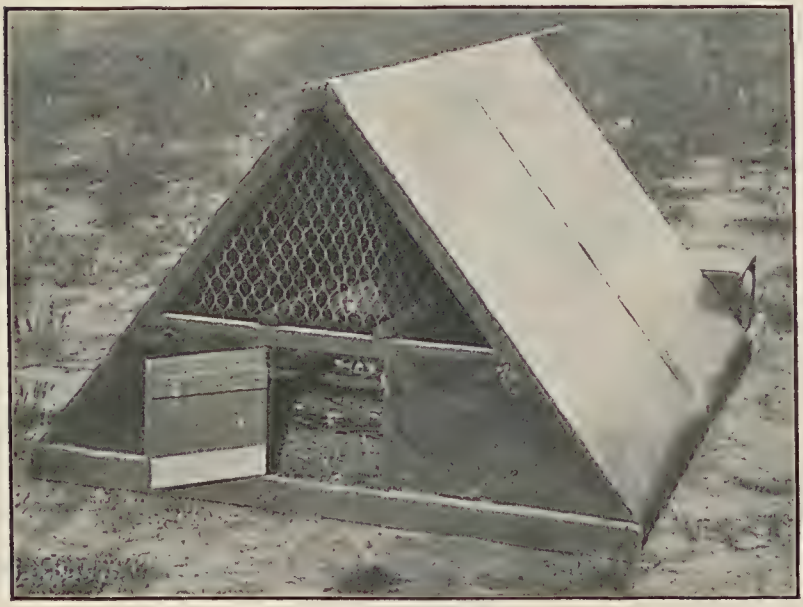
rain-water run under the house, the birds have a dry place to stand upon. Further, when the house is being used for laying hens, it prevents them carrying dirt into the nests and soiling the eggs. It also prevents loss from smothering. Every poultry man knows the risk of shifting growing chickens to new quarters. Great loss is experienced at times, as the chickens often sleep on the floor and crowd one on top of another, with the result that those underneath smother. With this netting floor, which is a couple of inches off the ground, even if the chickens do heap up, those underneath get sufficient air through the meshes. Since using a frame floor of the kind described, I have never had a chicken smothered, although I have reared some thousands in one of the hottest parts of the Goulburn Valley.

These houses are particularly recommended for use in the orchard. By shifting them between the trees a few feet every two or three days, the ground will be well manured, the birds will be greatly benefited by the shade of the trees, and in their foraging will rid the orchard of many destructive insects. Several houses can be used in the same orchard or paddock, if placed 50 or 60 feet apart. Movable hurdles are used to make a small enclosure round the house for two or three days. By the end of that time the birds will have become accustomed to their particular house, and the hurdles can then be taken away and used for another house.

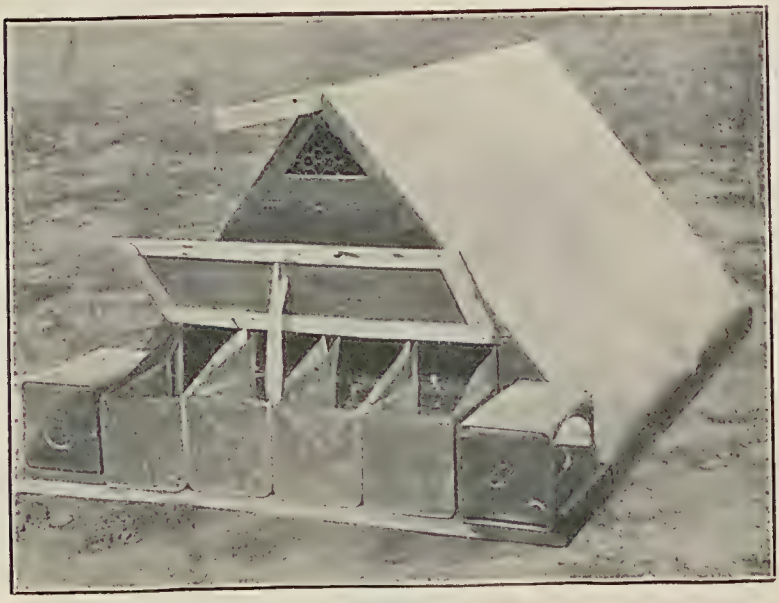
It is seldom, even on a large farm, that a great number of chickens are to be put out at one time; therefore, a few hurdles are sufficient. Five of them made of 2 x 1 hardwood, 10 feet long and 3 feet high, covered with wire netting, should be enough for one house. Of course, hurdles of this height would not keep birds in for any length of time; but it will be some days before chickens, ten or twelve weeks' old, attempt to fly over. By that time they will be well used to their new house, and the hurdles may be removed; for even though the young birds from the various houses mingle during the day, especially at feeding time, at roosting time they will return to their respective houses.

If it is desired to run cockerels in the same paddock as pullets, a suitable enclosure can easily be made. What is required is a set of four frames of 3 x 1 hardwood battens, 18 feet long, 6 ft. 4 in. high, with two bars 6 feet from each end, and covered with 72 x 2 wire netting. The battens at each end of the frame should be cut 6 ft. 10 in. long, allowing 3 inches to project above and below the frame. The projecting pieces at the bottom should be pointed, so that when erected they can easily be driven into the ground. A loop of hoop-iron may be slipped over the projecting pieces at the top, coupling them together. If the loops be made a neat fit, they will hold the frames very securely. This method of fastening the hurdles is much better than simply nailing them, as they can then be taken down and erected much more quickly, and without damage to the hurdles. Access to the yards is easily gained by slipping off the loop at one corner and stepping through; but, if required, it is a simple matter to let a small gate into one of the frames. This, however, will probably not be necessary.

A yard of this size contains over 300 square feet, and is sufficient for 50 chickens for several days. At the end of that time the house can be shifted, and the frames re-erected in a few minutes on fresh ground.



Portable Fowl House.



Another View.

When transferring chickens from the brooders to these colony houses, it should be done late in the afternoon. After feeding them they should be placed in the colony house, the door closed, and the hurdles placed in position round the house. They should be left till next evening, when the door can be opened and feed and water supplied. After feeding they will return to the house to sleep without any trouble; in two or three days the hurdles can be removed and used for the next lot to be put out. When shifting the houses they should be kept about the same distance apart, and not moved too far at one time (a few feet is sufficient), otherwise there is a danger of the birds refusing to go to the house in its new position, and they will camp on the ground where the house last stood.

Materials for the House.

The material required for the construction of the house and hurdles described is as follows:—

For the house—

Two pieces of 3 x 1 hardwood, 7 ft. 2 in. for the bottom.
Two pieces of 3 x 1 hardwood, 4 ft. 10 in. for the bottom.
One piece of 2 x 1 hardwood, 5 feet for the bottom.
Six pieces of 2 x 1 hardwood, 4 feet for sides.
One piece of 2 x 1 hardwood, 8 feet for ridge.
Two pieces of 2 x 1 hardwood, 3 feet for perches to rest on.
One piece of 2 x 1 hardwood, 3 ft. 4 in. to hinge nest lid to.
One piece of 2 x 1 hardwood, 1 ft. 4 in. for ventilator at back.
Two pieces of 2 x 1 hardwood, 1 ft. 3 in. for door frame.
Two pieces of 2 x 1 hardwood, 5 ft. 10 in. for perches.
One door, 1 foot square.
Six pieces No. 14 gauge wire, 8 ft. 6 in. to support ruberoid.
Two pieces No. 2 ply ruberoid, 8 ft. 4 in. for roof.

For front—

One kerosene tin flattened out and cut in half—half to cover in each side of door.
One pair of 1½-inch butt hinges.
One piece of wire netting, triangle shaped (3 feet at base, 2 feet to peak).

For back—

One and a half kerosene tins flattened out—one above the nest boxes and a quarter on each side of them.
One piece of tin, 3 ft. 3 in. by 1 ft. 3 in (cover for nests).
One pair butt hinges, 1½ inches for cover.
One piece of wire netting for ventilator, 1 foot at base, 8 inches to peak.
Four kerosene tins for nests.
One kerosene tin for water.
One kerosene tin for shell grit and charcoal.

For floor frame—

Two pieces 2 x 1 hardwood, 5 ft. 7 in.
Four pieces 2 x 1 hardwood, 4 ft. 7 in.
One piece wire netting, 5 ft. 7 in. x 4 ft. 7 in., 1½-in. mesh.

For hurdles—

Two pieces 2 x 1 hardwood, 10 feet, top and bottom rails.
Two pieces 2 x 1 hardwood, 3 ft. 10 in., for ends.
One piece 2 x 1 hardwood, 3 ft. 4 in., for centre stay.
Piece of wire netting 10 feet x 3 feet.
To make loops of hoop-iron, cut pieces 1½ inches long, lap 1 inch, and rivet.

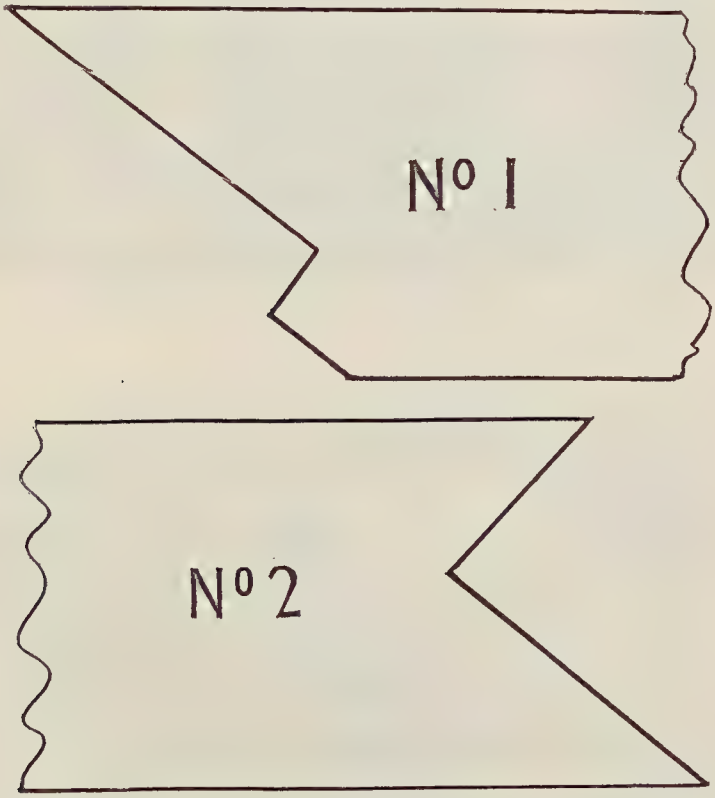
For large-frame hurdles—

Two pieces 3 x 1 hardwood, 18 feet long, top and bottom rails.
Two pieces 3 x 1 hardwood, 6 ft. 10 in. long, for ends.
Two pieces 3 x 1 hardwood, 6 ft. 4 in. long, for stays.
6 yards wire netting, 72 x 2.
To make loops of hoopiron, cut pieces 1 ft. 3 in. long, lap 1 inch, and rivet.

How to Build the House.

The following is written in the hope that it will be some assistance to the poultry man who wishes to do his own building:—

Scarf out sufficient at the end of each of the 7 ft. 2 in. pieces of timber to take a 2 inch x 1 inch batten; lay the two 7 ft. 2 in. pieces 4 ft.

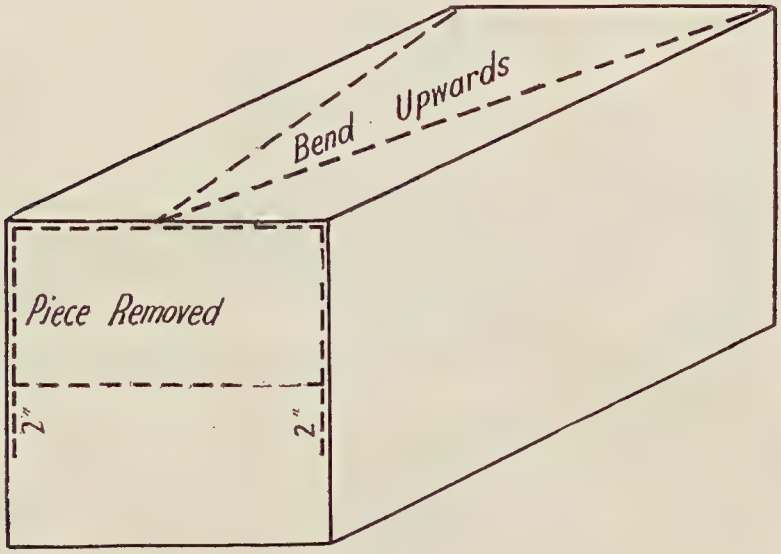


10 in. apart with the scarfed edges up, and nail on the 5-ft. 2-in. x 1-in. piece. Next place one of the 4 ft. 10 in. pieces 14 inches from this, and the other 4 ft. 10 in. piece between the ends of the 7 ft. 2 in. pieces, and nail securely together. Turn this over, and it will form the bottom frame of the house. Then take four pieces of 2 x 1, 4 feet long, and cut the ends by the template shown, which is actual size, No. 1 for the top to receive the ridge pole, No. 2 for the bottom, which fits the bottom frame. Place two of these pieces in position at the front, and two

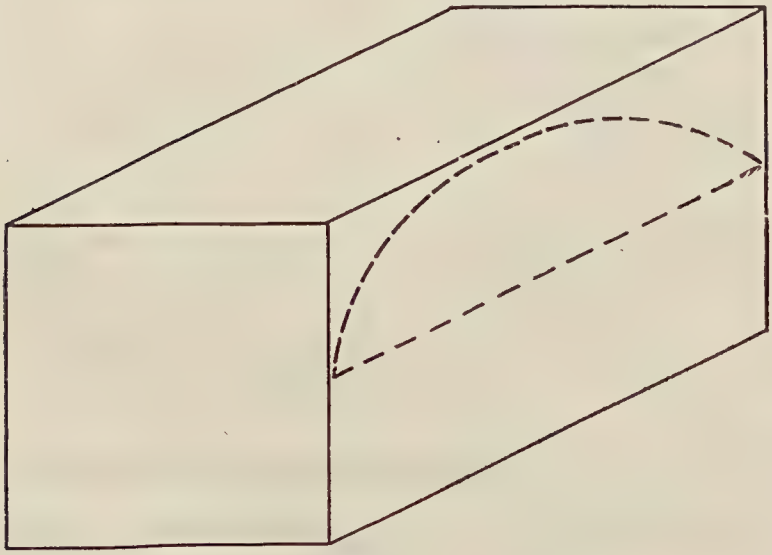
at the back, and nail to the 3 x 1 frame inside; put the 8-ft. ridge pole in the places cut to receive it, allowing it to project 6 inches in front and 18 inches at the back. This provides a good hand hold for shifting the house about. Then take the other two pieces of 4-ft. timber; use the same template, but cut the angles on the flat as these two pieces are for the centre of the house where the ruberoid joins. Next cut the two pieces of 3-ft. timber so that they will fit between the uprights at each end of the house; on these the perches will rest. Cut the piece of 1 ft. 4 in. to fit between the uprights at the back 8 inches from the top; this is for ventilation. Then nail the two pieces of 1 ft. 3 in., 1 foot apart, to the bottom frame at the front, so as to form the door frame; the tops of these help to support the 3-ft. piece the perches rest on. Nail the piece of 3 ft. 4 in. across the back, 1 foot from the bottom frame, so that the hinged lid of the nest tins can be hung to it. Then take the six pieces of 14-gauge wire; drill holes 8 inches apart in the bottom frame of the house; fasten one end of each of the wires in these holes, pass the other ends over the ridge pole, stretch fairly tight, and fasten to the frame at the bottom on the other side. These wires support the ruberoid, and prevent it from sagging. One kerosene tin flattened out and cut in half is sufficient to close in the spaces each side of the door; the space above the door is covered by a piece of wire netting. To close in the back, make a light frame, and cover it with a piece of tin 3 ft. 3 in. x 1 ft. 3 in. By hinging this to the 3 ft. 4 in. piece of timber at the back a lid is made for the nest tins. Flatten out a whole kerosene tin and half of another. Spread a quarter of the flattened tin over the spaces each side of this hinged lid; the balance will be required to close in the space between the hinged lid and the ventilator. Two inches of the bottom of this tin should be bent outwards at right angles, in order to prevent rain running down the back of the house into the nests. The ventilator space, about 1 foot by 8 inches to the peak, should be covered with a piece of wire netting. Bore holes 1 foot apart in the two pieces of timber that are to support the perches, and corresponding holes in the ends of the perches. They can then be held in position by placing a nail in the holes. If this be done it will be easy to remove the perches at any time for inspection for mites, &c. The ruberoid can then be tacked on, the door fitted, and the house is then complete.

The most convenient way to catch birds in these houses is to have a light stick or cane 6 feet long, with a piece of No. 8 fencing wire fastened to the end, and bent as shown hereunder:—

After a little practice with this device, any bird in the house can be quickly caught by the leg.



Kero. Tin for Nests



Kero. Tin for Water. Also Shell Grit & Charcoal

Making the Nests.

Cut kerosene tins along dotted lines as indicated in diagram on page 246. Remove the pieces at the end dotted round, and then cut down 2 inches on each side where indicated by dotted lines. Cut out the three corner-pieces on the top, and bend upwards. The piece of tin which has been cut down 2 inches in the front should be bent to fit over the 3 x 1 batten on the bottom frame of the house. This will be sufficient to hold it in position without nailing; the back of the nest tin will rest on the 2 x 1 piece of timber. These nest tins should always be removed when the house is to be used for chickens, or they will all crowd into them to sleep.

POULTRY FEEDING EXPERIMENT.

A. V. D. Rintoul, N.D.D., Chief Poultry Expert; W. C. Rugg, Poultry Foreman, State Research Farm, Werribee.

The following feeding experiment was carried out at the Central Research Farm, Werribee, from 1st March, 1920, to 31st December, 1920:—

One hundred and twenty White Leghorn pullets, all of the same strain, were divided into three groups of 40 in each group, of as nearly equal quality as was possible.

No. 1 pen was fed wet mash in the morning, chaffed green stuff at midday, and grain at night.

No. 2 pen was fed grain in the morning, chaffed green stuff at midday, and wet mash at night.

No. 3 pen was fed dry mash in hoppers, always open, chaffed green stuff at midday, and grain at night.

Housing.

The birds were housed in part of a laying shed facing east, 120 feet long, 20 feet deep, 9 feet high in front, sloping to 7 feet high at back. In the front of the house, 21 inches from the floor upwards, and 15 inches from the roof downwards, were covered with corrugated iron, the rest of the front being 6 feet of wire netting. The shed is constructed of corrugated iron throughout. The floor consists of earth rammed hard, and covered with straw litter about 6 inches deep. Each pen of 40 birds had 160 square feet of floor space, *i.e.*, 4 square feet of floor space per bird, and were kept in the pen throughout the test, no outside run being made available.

A dust bath was provided, and shell grit and charcoal were always available. The partitions between the pens were boarded up 15 inches, and the rest wire-netted. Dropping-boards were used underneath the perches.

Systems of Feeding.

Pen I. and II.—*The wet mash* was composed of equal parts, by measure, of bran, pollard, and chopped green stuff, the bran being moistened with soup made from boiled table scraps, sheep's heads, and livers (when sheep's heads were not available meat meal was used) and dried off with the pollard to a nice crumbly condition, after which the green stuff was added.

Pen III.—*The dry mash* was made up of equal quantities of bran and pollard by measure, and about 10 per cent. of meat meal added to the mixture.

The green stuff used consisted of green oats, barley, rye grass, and lucerne, always cut fresh and then put through the chaffcutter.

The grain consisted of wheat, with the occasional addition of barley.

Pens I. and II. each received 1,530 lbs. of wet mash; 1,224 lbs. chaffed green stuff, and 1,377 lbs. grain.

Pen III. received 290 lbs. bran, 585 lbs. pollard, and 105 lbs. meat meal, with 1,224 lbs. chaffed green stuff and 1,377 lbs. grain. Neither salt nor black sugar were added to this mash.

Health of the Birds.

A somewhat severe outbreak of chicken pox occurred at the end of July, which was responsible for a heavy reduction in the egg supply, particularly in Pens. I. and II.

The heat wave which was experienced at Christmas time proved very trying to the birds, and three died in Pen I., six died in Pen II., and one died in Pen III. on 23rd December, otherwise the general health of the birds was good. Traces of broodiness were observed during November and December in a few of the birds in Pen II., which were fed grain in the morning and wet mash at night.

Detailed Results.

Month.	Pen I.				Pen II.				Pen III.				Market Price.	
	Eggs.	Value.			Eggs.	Value			Eggs.	Value.				
		£	s.	d.		£	s.	d.		£	s.	d.	s.	d.
March ..	512	3	18	2·66	467	3	11	4·16	436	3	6	7·33	1	10 doz.
April ..	621	5	12	1·50	418	3	15	5·66	394	3	11	1·66	2	2 „
May ..	578	6	4	5·16	366	3	18	9·50	504	5	8	6	2	7 „
June ..	593	5	11	2·25	581	5	8	11·25	517	4	16	11·25	2	3 „
July ..	768	7	9	4	634	6	3	3·33	662	6	8	8·66	2	4 „
August ..	395	2	14	10·33	364	2	10	6·66	527	3	13	2·33	1	8 „
September	683	4	14	10·33	602	4	3	7·33	743	5	3	2·33	1	8 „
October ..	715	5	9	2·83	616	4	14	1·33	722	5	10	3.66	1	10 „
November	743	5	3	2·33	566	3	18	7·33	787	5	9	3·66	1	8 „
December	636	4	17	2.	474	3	12	5	697	5	6	5·83	1	10 „
Total ..	6,244	51	14	7·39	5,088	41	17	1.55	5,989	49	4	4·71		

Income and Expenditure.

As the foodstuffs were products of the Research Farm, they were charged against the Poultry section at wholesale rates, consequently the cost of food would prove misleading to the ordinary breeder, who would

have, usually, to purchase at retail prices. However, it may be assumed that the average poultry farmer last year paid about 2¾d. per bird per week for fowl feed, and on this basis the cost of feed per bird for the ten months' test would have been about 9s. 11d., against a return from the sale of eggs of about 23s. 10d., showing thereby a profit over feed bill of approximately 13s. 11d. per bird for ten months.

Conclusions to be Drawn from the Test.

It may reasonably be concluded that a decisive result was obtained regarding the advantage of mash in the morning and grain at night (Pen I.) over grain in the morning and mash at night (Pen II.); the difference being 1,156 for ten months from 40 birds in favour of Pen I., which works out at the rate of 34 eggs per bird for twelve months. On the other hand, the difference between Pen I. and Pen III. (dry mash) was only 255 in ten months for 40 birds, which only averages 7½ eggs per bird for twelve months in favour of wet mash. Part of this advantage might be due to individual variation, and the main conclusion to be drawn is that dry-mash feeding gives almost equally good results, with a great saving in labour.

REARING CALVES ON MILK SUBSTITUTES.

The results of experiments show that not only is there a great gain over whole milk feeding by substituting separated milk and fat substitutes, but that the live-weight increase after weaning is almost as good in the case of calves reared on separated milk and milk-fat substitutes as with those fed on whole milk. True, the whole milk gives the greatest increase in live weight during rearing, and no substitute comes up to it in this respect if the cost is not taken into account, but the increase is obtained at so great a price as to make it entirely incommensurate with the value of the increase. Calves, after they have reached a month to six weeks of age, can be quite economically and profitably reared without any whole milk at all. A calf up to a month old will require only from 20 to 25 gallons whole milk.

In America much calf rearing is done and recommended by the Department of Agriculture in the form of feeding the separated milk and meal separately. The meal is given to the calves in the dry condition, the calves are taught to feed when from seven to ten days old by placing a little of the grain in their mouths after feeding the milk, and in this way their attention is called to the meal instead of sucking each other's mouths, ears, &c. They soon learn to eat the meal greedily. The Department state it is not advisable to mix any starchy meals with the milk. The starch of the meal is intended to take the place of the fat of the milk, and its form must be changed to sugar before it is digestible. This change is largely effected by the saliva of the mouth. If the grain is gulped down with the milk, there is no time for the saliva to act, hence intestinal troubles follow. The recommendations of the Kansas Experimental Station are that separated milk can be introduced gradually (1 lb. separated milk substituted for 1 lb. milk until

all the latter is replaced) when the calf is fourteen days old. At seventeen days age the calf is taught to eat grain as described above. The grain which gave the best result was a mixture of kaffir corn ground and whole maize.

Maize fed whole proved better than when fed as meal, while kaffir corn fed as meal gave the better results than when fed whole. The grain was given in amount averaging 1 lb. per head for the whole rearing period of seventeen weeks.

In the Kansas experiments above referred to, tests were carried out with *milk substitute,* entirely replacing the whole milk, such as—

(*a*) Butter-milk, with kaffir corn and whole maize fed dry, the calves were fed for eighteen weeks, ten calves on separated milk and corn and ten on butter-milk and corn.

The butter-milk calves increased on an average 1.79 lbs. daily, and the separated-milk calves increased on an average 2.02 lbs. daily.

Although the butter-milk did not give such good results as the separated milk, yet the gains are very satisfactory, and point distinctly to the advisability of using butter-milk in the absence of separated milk, and where the former is produced at home or somewhere in the neighbourhood. It would appear from the experiments that the butter-milk was gradually introduced to displace the whole milk when the calves were three or four weeks old, by substituting 1 lb. at a time, as was the case with the separated milk.

(*b*) Whey.—Whey, unlike separated milk, is not whole milk minus the fat only, but minus the casein as well.

Whey was introduced gradually with calves aged from three to five weeks and a mixture of kaffir corn and sifted oats fed dry with as much meadow hay as the calves would take. It required two weeks to completely displace the whole milk. One to one and a half gallons of whey were fed daily, but the calves needed watching, and the whey was withheld if any tendency to scour showed itself. The grain, however, seemed to counteract this tendency. No records are given as to the final weights, but it is remarked that the calves at the end of the experiment looked as well as the average separated milk-fed calves on the farm. One cannot see why cod liver oil or cotton seed oil added here should not have given even better results.

(*c*) Hay Tea.—Made by steeping hay in a copper of water and then boiling for one to two hours until 12 lbs. hay produced 100 lbs. tea. The tea was then fed in quantity similar to separated milk. Three-quarters of a pound of linseed meal was fed after making into a jelly along with the hay tea. Hay was fed *ad lib.* and kaffir corn and middlings fed dry. The gains in live weight were less than 1 lb. daily, viz.: .86 lb., and altogether the results showed hay tea to be unsatisfactory. It is a fact, however, that many calves have, in time past, been reared in England with a certain amount of hay tea, but as no statistics of live weight gains are available it is impossible to say whether they made satisfactory progress.

At present there appear to be no really good milk substitutes for calf-rearing generally available, but assuming the milk producer makes butter or cheese, he has separated milk or whey to fall back upon, which, as has been shown, can be usefully employed for the purpose; and if he sell all his milk, he can, if procurable, purchase separated milk and raise calves economically on it and cotton-seed oil.

—*The Farmers' Advocate,* South Africa, Feb., 1921.

STALLIONS REGISTERED UNDER THE HORSE BREEDING ACT FOR SEASON 1920-21.

From 16th November, 1920, to 15th February, 1921 (inclusive).*

(3rd List.)

Cert. No	Name.	Age.	Class.	Owner.	Address.
1074	Abbey Mac	A	Light	T. Shearwood	Dooen North
1165	Admiral Moray	5	Draught	T. J. Keogh	Jarklan
1064	Advance	5	,,	F. and E. Huf	Hopetoun
1089	Agitation	A	,,	J. Ball	Werribee
1153	Almaur	3	Light	A. R. B. Guest	St. Kilda
1121	Almont of Rythdale	A	,,	E. Wright and Son	Pakenham East
1092	Almost	A	,,	D. Lang	Tungamah
1077	Athlete	3	Pony	J. Lane	Armadale
1157	Barbour II.	A	Draught	J. Richardson	Berriwillock
1154	Barnono	A	,,	G. A. Dunnett	Stockyard Hill
1094	Baron Majestic	4	,,	A. Colvin	Nathalia
1066	,, McKie	A	,,	A. Creighton	Tungamah
1083	Big Ben	3	,,	A. H. Tate	Ouyen
1173	Blue Ribbon	6	,,	J. Dillon	Manangatang
1116	Boxer	A	,,	J. Dwyer	San Remo
1113	Briggen Lad	A	Pony	A. H. Lamb	Nerrin Nerrin
1124	Bright Star	A	,,	J. J. Simkin	Chetwynd
1168	Caledon	A	Thoroughbred	W. J. Keys	Pyramid
1185	Camantine	A	Light	H. A. Austin	Elaine
1107	Cannonite	A	Pony	J. C. H. Graves' Estate	Mansfield
1084	Carden	A	Light	W. H. Penaluna	Boolarra
1177	Carolyn	A	Draught	J. Withers	Mansfield
1159	Cedric	A	,,	T. Robertson	Moyne Falls
1071	Clarendon II.	A	Pony	C. Underwood	Newfield
1081	Clyde Boy	A	Draught	J. Walder and Sons	Watchem
1128	Cobbler	3	,,	O. Olson	Joparit
1072	Cosmopolitan II.	A	Light	Wade Bros.	Glen Alvie
1182	Dan Bells	A	,,	M. Coffey	Richmond
1111	Dandy Dick	A	Pony	L. Bennett	Nullawil
1106	,, Duke	A	,,	Kong Meng Bros.	Longwood
1147	Danodite	A	Draught	P. Gardiner	Carlisle River
1126	Defender	A	,,	J. Ballantyne	Buln Buln
1134	Delavan Junior	6	Light	M. E. McMurtrie	Albert Park
1073	Dixie Alto	A	,,	J. L. Henderson	Wangaratta
1127	Dixie Boodle	A	,,	Annie May Pitman	Clifton Hill
1093	Drum Marshall	A	Draught	J. C. Whiteacre	Gunbower
1119	Duke	A	,,	E. A. Thornley	Hawkesdale
1086	Duncan Stewart	3	,,	J. Fitzpatrick	Heyfield
1138	Federation's Pride	A	,,	W. Major	Dooen North
1104	Foreigner	A	Pony	C. Ferrari	Devondale
1158	Free Scot	A	Light	T. Robertson	Moyne Falls
1162	Garfield Junior	A	Pony	,,	,, ,,
1105	Garnet	4	Light	J. J. Carmody	Leongatha
1163	General Keith	6	Draught	T. Nunan	Nowie
1137	Ginger	A	Light	D. McLean	Chiltern
1188	Glad Bells	A	,,	D. McLeod	Kyabram

* For registrations prior to 15th February, see October and December issues of this *Journal*.

Stallions Registered under the Horse Breeding Act for Season 1920–21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
1172	Glad Star	3	Draught ..	Metropolitan Board of Works	Werribee
1098	Glenfallock ..	A	„ ..	A. H. Johnston	Walpa
1097	Glengarnock ..	5	„ ..	B. Mackenzie ..	Bass
1155	Gospel Bells ..	A	Light ..	J. G. Christie ..	Healesville
1103	Grey Marvin ..	A	„ ..	J. S. W. Uren ..	Krowera
1075	Griffo	A	Pony ..	T. Hourigan ..	South Purrumbete
1166	Hamilton Hero ..	A	Draught ..	A. Booley ..	Banyan
1088	Havoc	6	Light ..	A. S. Rodgers ..	Horsham
1096	Hero	A	Draught ..	J. T. Baker ..	Tyabb
1179	„	A	Pony ..	T. Park ..	North Wonthaggi
1181	Honest Cleve ..	A	Light ..	J. W. Mooring ..	Chillingollah
1112	Jet	A	Pony ..	D. H. McConnell	Longford
1079	Jingal King ..	A	Light ..	P. H. Brett ..	Linton
1069	Joe Horner ..	A	Draught ..	Murphy Bros. ..	Clydebank
1186	Ki Ki	A	Pony ..	J. T. Laidlaw ..	Chetwynd
1176	King Almont ..	A	„ ..	J. Clarke ..	Mortlake
1061	„ Clyde ..	5	Draught ..	T. O'Brien ..	Hopetoun
1135	Kumalong ..	4	Light ..	L. W. Anderson	Camperdown
1178	Laird of Selkirk ..	A	Draught ..	W. Troy ..	Myall
1169	Last Mistake ..	A	Light ..	Stock Bros. ..	Sandford
1174	Little Pos ..	A	Thoroughbred	A. K. Urquhart ..	Hexham
1129	Light o' Frisco ..	A	Light ..	P. C. Handrick ..	Moutajup
1091	Macedon Hero ..	3	Draught ..	P. Williams ..	Riddell's Creek
1140	Marathon	3	Pony ..	J. G. Stewart ..	Hamilton
1076	Masher Boy ..	A	„ ..	T. Millington ..	Yaapeet
1090	Master Dillon ..	3	Light ..	J. Vallance ..	Bacchus Marsh
1143	Merry Oliver ..	A	„ ..	E. R. de Little ..	Caramut
1164	Mickey	A	Pony ..	R. Booley ..	Banyan
1161	Minature III. ..	A	„ ..	T. Robertson ..	Moyne Falls
1099	Moolap	A	Light ..	T. Mitchell ..	Durham Lead
1146	Oakwood Boy ..	2	„ ..	A. E. Kay ..	Dean
1171	Orinoco	A	Thoroughbred	G. Ritchie ..	Delatite
1095	Oyama	A	Light ..	J. H. Rodgers ..	Yendon
1115	Panic	5	„ ..	R. Hawkins ..	Dalyston
1144	Predominate ..	A	„ ..	E. R. de Little ..	Caramut
1184	Preston Junior ..	A	„ ..	J. McLure and Son	Drummond
1151	Prince Alexander ..	A	Draught ..	Trask Bros. ..	Warncoort
1068	„ „ II. ..	6	„ ..	D. and J. McNabb	Morwell
1087	„ Charming ..	A	Light ..	A. Constantine ..	Healesville
1175	„ Douglas ..	A	„ ..	P. Martin ..	Molesworth
1156	„ Nyallo ..	3	„ ..	W. T. McAlpine	Hopetoun
1145	Rimfire	A	Pony ..	Lucas Bros. ..	Carlisle River
1133	Ringmaster ..	A	Draught ..	A. Drennan ..	Walpeup
1078	Robin	A	„ ..	R. Dickinson ..	Hardings
1152	„ Roy ..	6	Light ..	C. Paulin ..	Port Melbourne
1117	Roy	5	Pony ..	R. P. Kennedy ..	Bass
1085	Royal	A	Draught ..	W. Hoysted ..	Mokoan
1122	Royal Churchill ..	A	„ ..	H. A. Wright ..	Pine Lodge South
1080	„ Albert ..	A	„ ..	D. B. Keys ..	Colac
1136	„ Duke ..	4	„ ..	C. W. Dennert ..	Hamilton
1100	„ Malt ..	3	Light ..	E. J. Wright ..	Gormandale
1130	Rufus	A	Thoroughbred	L. J. Weatherly	Mortlake
1131	Salient	A	Pony ..	„	„

STALLIONS REGISTERED UNDER THE HORSE BREEDING ACT FOR SEASON 1920–21—*continued.*

Cert No.	Name.	Age.	Class.	Owner.	Address.
1065	Sam Huon ..	4	Light ..	J. O'Brien ..	East Melbourne
1180	Scottish Lad ..	A	Draught ..	A. P. Huf ..	Byrneville
1067	Sea Voyage ..	3	Light ..	K. Noonan ..	Redesdale
1149	Selkirk	A	Draught ..	T. T. Mulder ..	Murroon
1114	Seymour	6	,, ..	J. Cleeland ..	Bass
1102	Shandon Bells ..	A	Light ..	Mrs. C. M. Mayne	Fitzroy
1062	Silver Cup ..	A	Draught ..	J. L. McLeod ..	Tongala
1109	Sir Dale	2	,, ..	W. Turnbull ..	Wedderburn
1167	,, Regulus ..	A	,, ..	J. B. Howe ..	Bridgewater
1170	Smoodger ..	A	Light ..	R. F. England ..	Essendon
1070	Standard	A	Draught ..	A. Rees ..	Nalangil
1101	Stockman's Lad ..	2	,, ..	O. Olson ..	Jeparit
1139	Straightaway ..	A	Light ..	T. Allen ..	Narriwillock
1108	Tammie o' Groat ..	2	Draught ..	A. L. Pitts ..	Merrigum
1148	Terminus	A	Light ..	R. G. Cardwell ..	Tallangatta
1132	The Bard	A	Draught ..	L. J. Weatherly	Mortlake
1150	,, Scrip	A	Thoroughbred	J. C. Ware ..	Tatyoon North
1120	Tom Pepper ..	A	Pony ..	E. A. Thornley ..	Hawkesdale
1082	Victor	2	Draught ..	S. G. Atkin ..	Vite Vite
1187	Wee McGregor ..	2	Pony ..	J. T. Laidlaw ..	Chetwynd
1110	Welcome Bells ..	4	Light ..	T. J. Splatt ..	Weering
1063	Wiltshire	A	,, ..	C. Wood ..	Minyip
1183	Yet Again ..	A	Pony ..	J. H. Hindhaugh	Weerite
1160	Young Ki Ki ..	A	,, ..	T. Robertson ..	Moyne Falls
1123	,, Lord Ronald	6	Draught ..	W. Phillips ..	Gorae West
1125	,, Robin ..	2	,, ..	Coe Bros. ..	Coleraine

RAINFALL IN VICTORIA.

Fourth Quarter, 1920.

District.	—	October.	November.	December.	Quarter.
		Points.	Points.	Points.	Points.
Mallee North ..	Amount	270	147	107	524
	Average	115	96	73	284
	Per cent. Departure ...	+135	+53	+47	+85
Mallee South ...	Amount	238	95	76	409
	Average	116	97	91	304
	Per cent. Departure ...	+105	−2	−16	+35
North Wimmera ...	Amount	172	157	70	399
	Average	144	107	100	351
	Per cent. Departure ...	+19	+47	−30	+14

RAINFALL IN VICTORIA—*continued*

District.		October.	November.	December.	Quarter.
		Points.	Points.	Points.	Points.
South Wimmera ...	Amount ...	144	213	67	424
	Average ...	189	126	121	436
	Per cent. Departure ...	−24	+69	−45	−3
Lower Northern Country	Amount ...	302	172	39	513
	Average ...	142	116	105	363
	Per cent. Departure ...	+113	+48	−63	+41
Upper Northern Country	Amount ...	329	195	56	580
	Average ...	184	137	128	449
	Per cent. Departure ...	+79	+42	−56	+29
Lower North-East ...	Amount ...	342	196	202	740
	Average ...	264	201	188	653
	Per cent. Departure ...	+30	−2	+7	+13
Upper North-East ...	Amount ...	492	328	157	977
	Average ...	392	303	283	978
	Per cent. Departure ...	+26	+8	−45	0
East Gippsland ...	Amount ...	439	190	282	911
	Average ...	271	228	252	751
	Per cent. Departure ...	+62	−17	+12	+21
West Gippsland ...	Amount ...	433	306	216	955
	Average ...	336	261	274	871
	Per cent. Departure ...	+29	+17	−21	+10
East Central ...	Amount ...	551	378	141	1,070
	Average ...	319	265	273	857
	Per cent. Departure ...	+73	+43	−48	+25
West Central ...	Amount ...	327	296	112	735
	Average ...	216	172	176	564
	Per cent. Departure ...	+51	+72	−36	+30
North Central ...	Amount ...	352	285	92	729
	Average ...	227	184	176	587
	Per cent. Departure ...	+55	+55	−48	+24
Volcanic Plains ...	Amount ...	147	293	105	545
	Average ...	225	179	159	563
	Per cent. Departure ...	−35	+64	−34	−3
West Coast ...	Amount ...	198	142	124	464
	Average ...	271	203	177	651
	Per cent. Departure ...	−27	−30	−30	−29

N.B.—100 points = 1 inch.

H. A. HUNT,
Commonwealth Meteorologist.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

As soon as the fruit is off the trees, the land should be well ploughed and left in a rough condition until the spring ploughing. If not already done, and the orchard conditions demand it, there is still time to put in a leguminous crop for green manuring purposes. But this should be done as early as possible, so as to give the crop a chance to make some good early growth. Soils deficient in lime or in organic matter are always benefited by a crop of green manures. Where stable manure is unprocurable, the green manure crop is the only means of adding organic matter to the soil.

Pests and Diseases.

All second-hand and old cases should be thoroughly overhauled. It is preferable to do this work now, instead of leaving it till spring, when the rush of other duties will certainly prevent it being carried out. The cases, if not bad enough to be destroyed by fire, should be dipped for some time in boiling water. And this is not only for the killing of the codlin larvæ, but also to destroy larvæ or eggs of any scale or aphis, and also any spores of fungus diseases that may have found lodgment therein.

As soon as the trees have shed their foliage they may be sprayed with red oil emulsion for woolly aphis, peach aphis, and the bryobia mite. And this should be done before pruning, so that in handling and carrying the prunings the pests will not be spread about the orchard to infect the clean portions.

The Flower Garden.

Bulbs, tubers, and corms of spring-flowering plants should now all be planted. As they appear above ground, they should be protected from the ravages of snails and slugs, as these pests have a very great liking for these succulent growths. A good surface dressing of broken leaf or dust tobacco will effectually deal with these pests. In fact, the gardener who constantly uses tobacco, either in the leaf, stem, or dust forms, will very soon be in the happy position that slugs and snails will cause him no anxiety whatever. Besides, the tobacco has manurial properties which are also valuable.

Pansy and any other seedlings, also rooted layers and cuttings, may now be planted out into their permanent positions.

Sowings may also be made of any hardy annuals, such as antirrhinum, aquilegia, correopsis, Canterbury bell, dianthus, everlastings, foxglove, gaillardia, hollyhock, larkspur, leptosyne, lobelia, marigold, pansy, petunia, stock, sweet peas, verbena, wallflower, &c.

The Vegetable Garden.

There should now be no untidy or undug beds in the kitchen garden. The vacant beds should all be well dug over and prepared for the planting of vegetables for use in spring. In digging, a top dressing of manure should be given; this may be dug in. All weeds, too, may be forked into the trenches, and covered well with soil as each spit or length is dug. A dressing of lime is very beneficial at this time of the year three or four weeks after the manure or weed dressing.

A start should now be made at cleaning out the asparagus beds. This vegetable is most popular, and yet one rarely met with in ordinary household gardens. It is supposed to be difficult to grow, but this supposition is not borne out, as, once established, a bed of asparagus is one of the most easily managed plots in the whole garden. Depth of good soil and plenty of manure are all that this plant requires.

In establishing a new bed, it is advisable to see that there is a good depth of 2 or 3 feet of rich, well-manured soil. If this is not present, the soil should be dug out to that depth, and thoroughly mixed and enriched with well-rotted manure before being replaced. A bed deeply prepared, and supplied with ample quantities of manure, should last without replanting for very many years. The young plants or crowns should then be planted in trenches, keeping the rows 2 or 3 feet apart. An asparagus bed requires ample and direct exposure to the full rays of the sun. The asparagus should not be cut during the first season after planting; in fact, it is better to allow it to go uncut for two seasons. As little foreign weed growth as possible should be allowed in the beds, but, when they are not producing culinary asparagus, rows of lettuce, beans, radish, &c., may be grown between the crowns.

Towards the end of April the tops may be cut down, the beds cleaned, and a good top dressing of stable manure given. Chemical fertilizers, such as bonedust, sulphate of ammonia, and sulphate of potash, may be given as a substitute to organic manure. In the past it has been the custom to annually top-dress the beds with salt. It was supposed that, as asparagus in its native habitat was usually found in sandy soils near the sea coast, the plant required salt or a saline soil to produce successful results. It has latterly been found that salt is not at all essential to good growth, and that the plant will readily adapt itself and grow well in soils of not at all a saline character. Where potash has taken the place of salt, quite improved results followed.

Seeds of onion, turnip, cabbage, cauliflower, carrot, and parsnip may now be sown.

REMINDERS FOR MAY.

Live Stock.

Horses.—Those stabled can be fed liberally. Those doing fast or heavy work should be clipped; if not wholly, then trace high. Those not rugged on coming into the stable at night should be wiped down and in half-an-hour's time rugged or covered with bags until the coat is dry. Old horses and weaned foals should be given crushed oats. Grass-fed working horses should be given hay or straw, if there is no old grass, to counteract the purging effects of the young growth. Attend to teeth and feet of horses to be turned out for the winter.

Sheep.—Keep in-lamb ewes in strong condition. Best lambing results are obtained when ewes are neither too poor, nor excessively fat. Once the lambs arrive then the most liberal treatment possible is in the main the most profitable. Ill-fed ewes are bad mothers, indifferent to the new-born lamb, and rearing them badly afterwards, particularly very young or very old ewes. Select fine weather for lamb-marking. Yard lambs over night. Never castrate or tail high-conditioned lambs immediately on being run in and overheated. The risk with large lambs will be lessened if they are allowed to stay in the yards an hour or two after castration and the coagulated blood drawn, which in many cases will be found retained in the groin and purse, no matter what method of opening the purse is used. In tailing never draw tails tight. Projecting bone delays healing, especially when cutting off with hot blades. Even with the knife leave enough loose skin to come over and cover the vein and check the usual strong rush of blood from lambs on well-fed mothers.

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